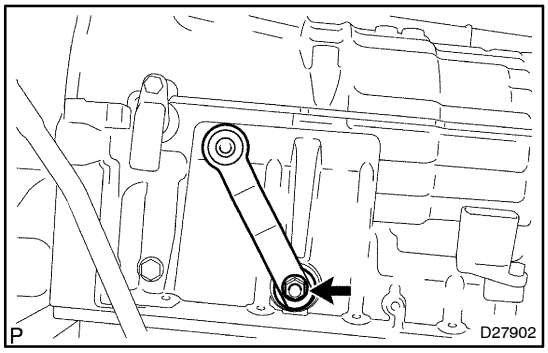
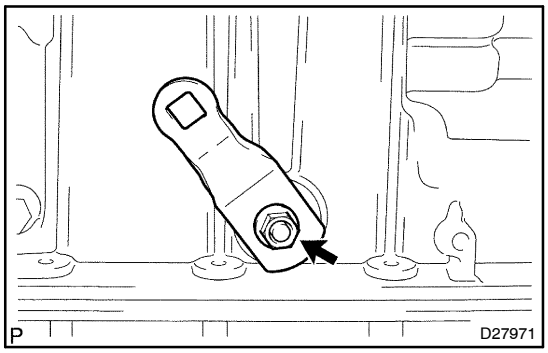
OVERHAUL



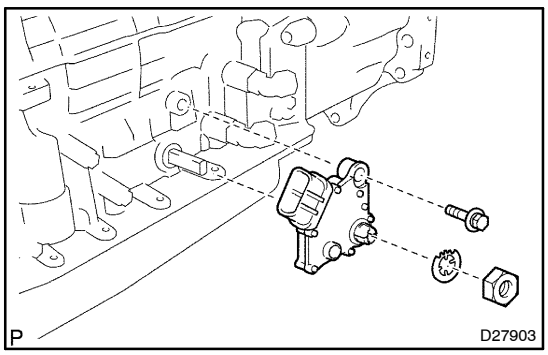
1. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH (A750F EXCEPT 4RUNNER,GX470)

(a) Remove the nut, the washer and the control shaft lever LH.



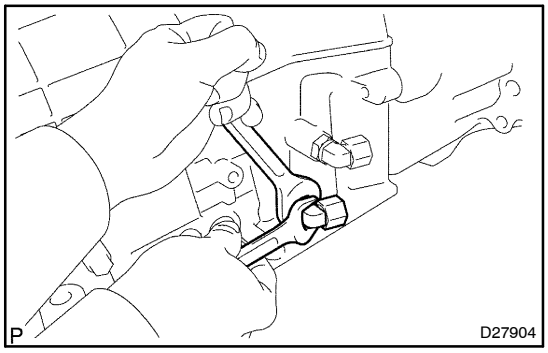
2. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH (A750# 4RUNNER,GX470)

(a) Remove the nut, the washer and the control shaft lever LH.



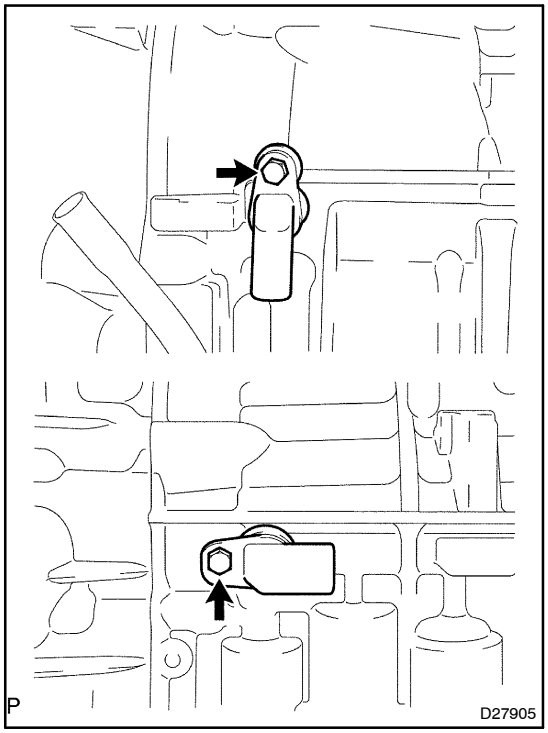
3. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

(a) Using a screwdriver, unstake the lock washer.
(b) Remove the lock washer, the nut and the bolt.
(c) Remove the park/neutral position switch.



4. REMOVE OIL COOLER TUBE UNION

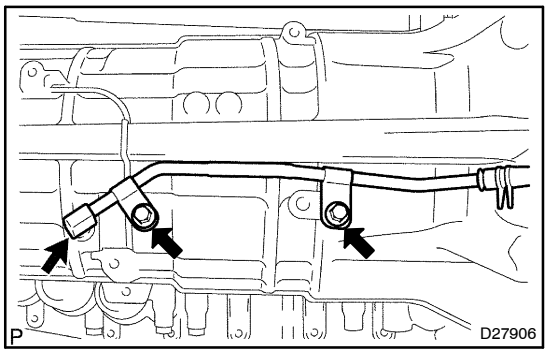
(a) Remove the 2 oil cooler tube unions.
(b) Remove the O–ring from the oil cooler tube union.



5. REMOVE TRANSMISSION REVOLUTION SENSOR

(a) Remove the 2 bolts and the 2 transmission revolution sensors.

(b) Remove the O–ring from each sensor.

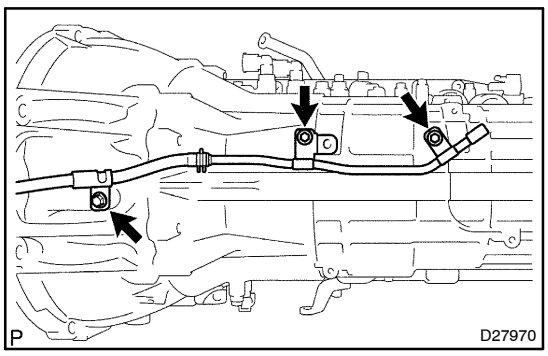


6. REMOVE AUTOMATIC TRANSAXLE BREATHER TUBE (A750F EXCEPT 4RUNNER,GX470)

(a) Remove the 2 bolts.

(b) Remove the breather tube.

(c) Remove the O–ring from each tube.

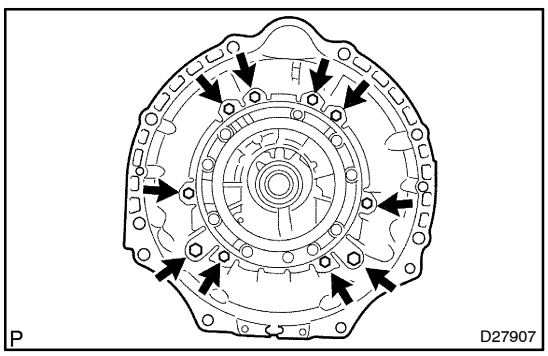


7. AUTOMATIC TRANSAXLE BREATHER TUBE (A750# 4RUNNER,GX470)

(a) Remove the 3 bolts.

(b) Remove the breather tube.

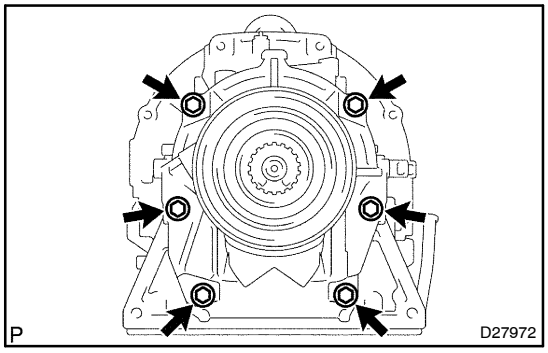
(c) Remove the O–ring from each tube.



8. REMOVE AUTOMATIC TRANSMISSION HOUSING

(a) Remove the 10 bolts.

(b) Remove the transmission housing.



9. REMOVE EXTENSION (ATM) HOUSING SUB–ASSY (A750E 4RUNNER)

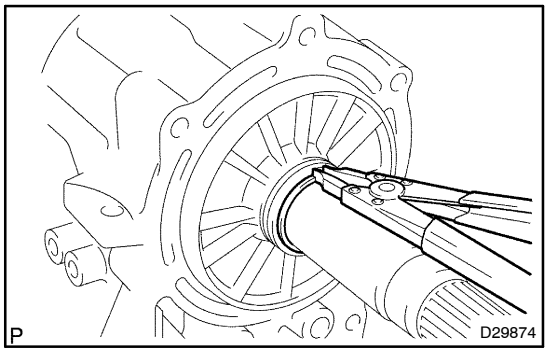
(a) Remove the 6 bolts.

(b) Remove the extension housing assy.

HINT:

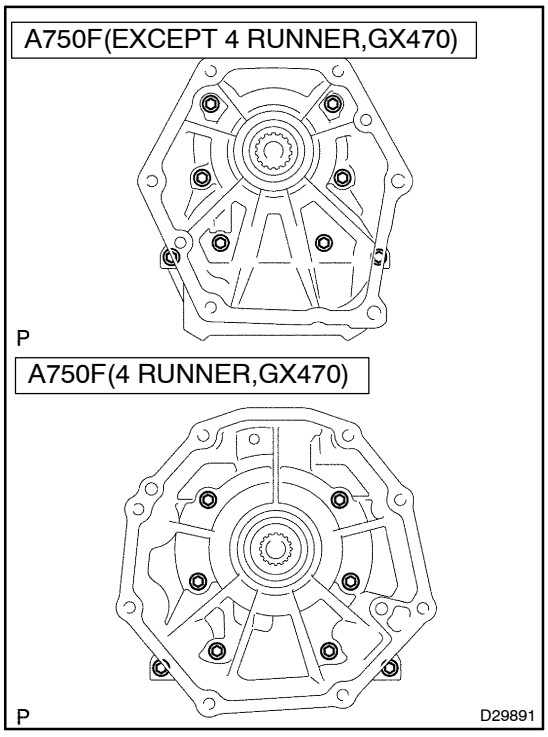
Use a brass bar and a hammer to remove the extension housing assy.

(c) Remove the gasket from the extension housing assy.



(d) Using a snap ring expander, remove the snap ring.

(e) Remove the thrust needle roller bearing and the 2 bearing races.



10. REMOVE TRANSMISSION CASE ADAPTER ADAPTER SUB–ASSY (4WD DRIVE TYPE)

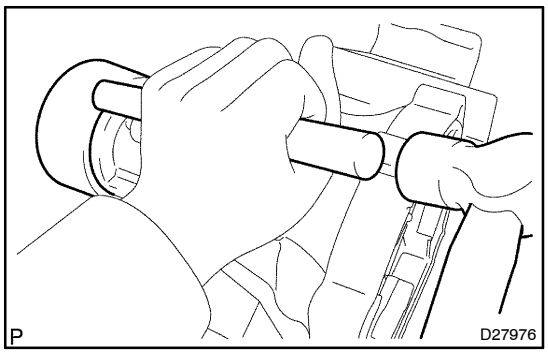
(a) Remove the 8 bolts.

(b) Remove the transmission case adapter assy.

HINT:

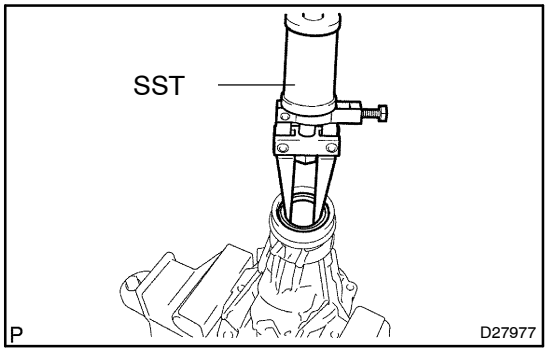
Use a brass bar and a hammer to remove the extension housing assy.

(c) Remove the gasket from the transmission case adapter adapter assy.



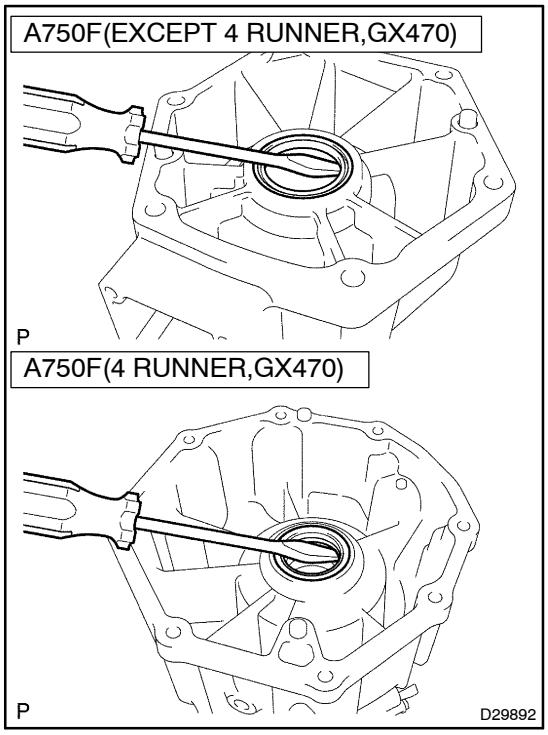
11. REMOVE EXTENSION HOUSING DUST DEFLECTOR (A750E 4RUNNER)

(a) Using a brass ber and a hammer, remove the extension housing dust deflector.



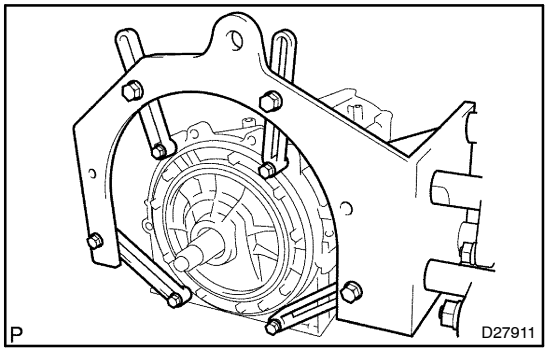
12. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL (A750E 4RUNNER)

(a) Using SST, remove the oil seal.
SST 09308–00010



13. REMOVE TRANSMISSION CASE ADAPTOR OIL SEAL (4WD DRIVE TYPE)

(a) Using a screwdriver, remove the oil seal.



14. FIX AUTOMATIC TRANSMISSION CASE SUB–ASSY

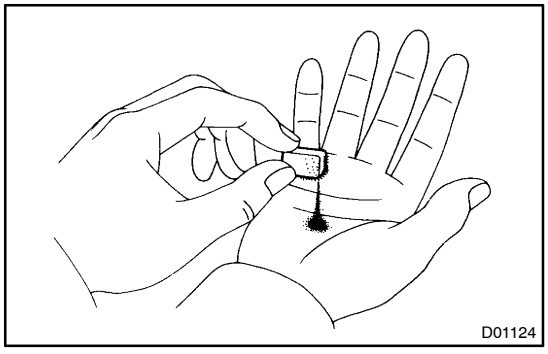
(a) Install the transmission case on the overhaul attachment.

15. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB–ASSY

NOTICE:

Do not turn the transmission over as this will contaminate the valve body with foreign matter on the bottom of the pan.

(a) Remove the drain plug and the 20 bolts.

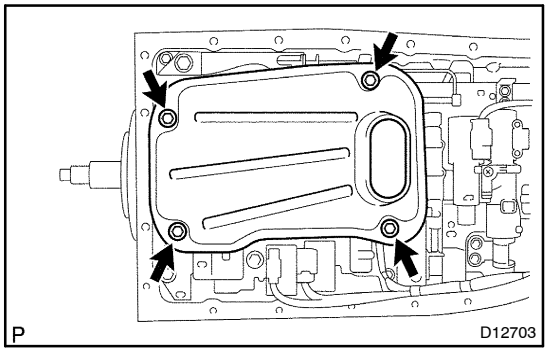


16. INSPECT AUTOMATIC TRANSMISSION OIL PAN SUB–ASSY

(a) Remove the magnets, and use them to collect steel particles.

(b) Carefully lock at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

- Steel (magnetic): bearing, gear and clutch plate wear
- Brass (non–magnetic): bushing wear

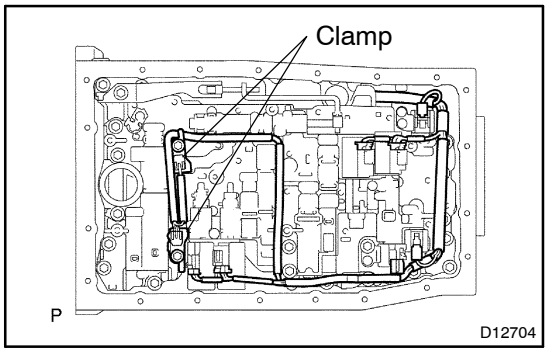


17. REMOVE VALVE BODY OIL STRAINER ASSY

(a) Turn over the transmission.

(b) Remove the 4 bolts holding the valve body oil strainer assy to the valve body.

(c) Remove the O–ring from the valve body oil strainer assy.

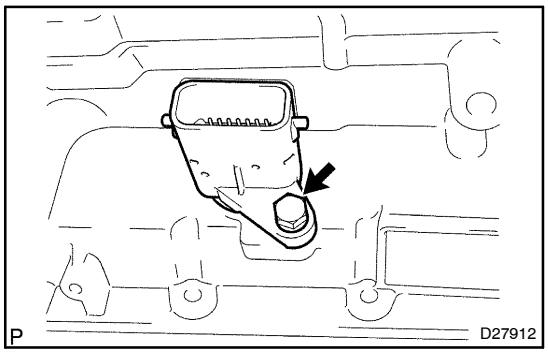


18. REMOVE TRANSMISSION WIRE

(a) Remove the ATF temperature sensor.

(b) Remove the bolt and the clamp.

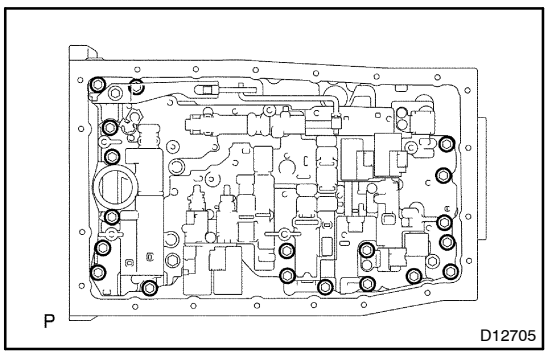
(c) Disconnect the 7 connectors from the shift solenoid valves.



(d) Remove the bolt from the case.

(e) Pull the transmission wire out of the transmission case.

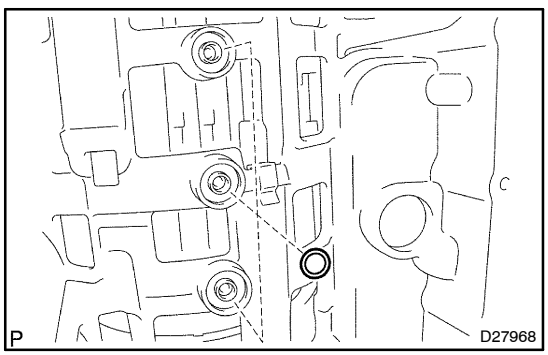
(f) Remove the O–ring from the transmission wire.



19. REMOVE TRANSMISSION VALVE BODY ASSY

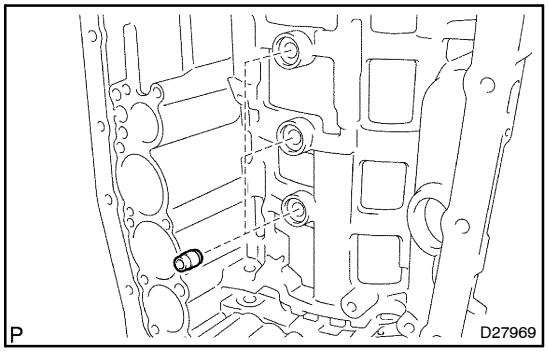
(a) Remove the 19 bolts.

(b) Remove the valve body assy.



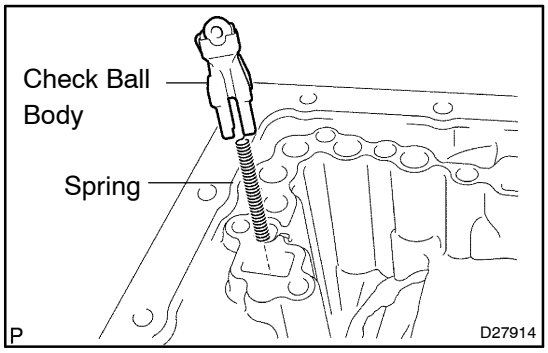
20. REMOVE TRANSAXLE CASE GASKET

(a) Remove the 3 transaxle case gaskets.



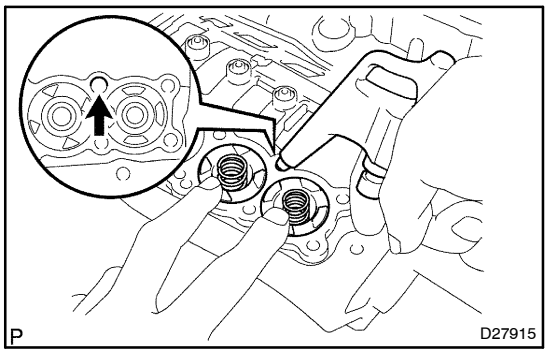
21. REMOVE BRAKE DRUM GASKET

(a) Remove the 3 brake drum gaskets.



22. REMOVE CHECK BALL BODY

(a) Remove the check ball body and the spring.



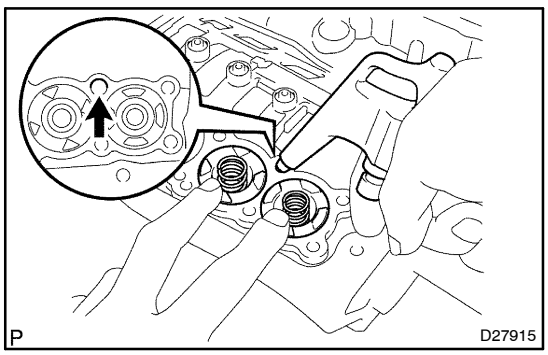
23. REMOVE C–2 ACCUMULATOR PISTON

(a) Applying compressed air to the oil hole, remove the C_2 accumulator piston and the spring.

(b) Remove the 2 O–rings from the piston.

NOTICE:

Take care as the C_3 and B_3 accumulator piston may jump out.



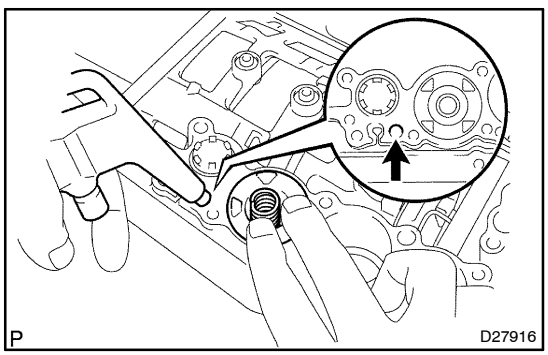
24. REMOVE B–3 ACCUMULATOR PISTON

(a) Applying compressed air to the oil hole, remove the B_3 accumulator piston and the spring.

(b) Remove the 2 O–rings from the piston.

NOTICE:

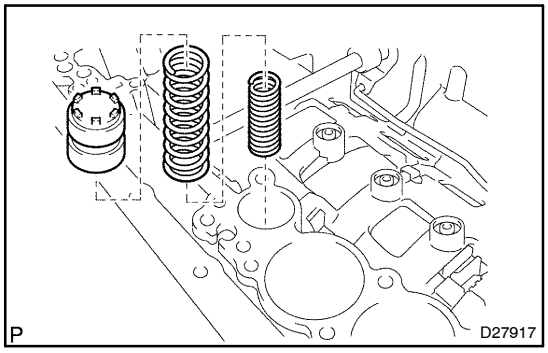
Take care as the C_3 accumulator piston may jump out.



25. REMOVE C–3 ACCUMULATOR PISTON

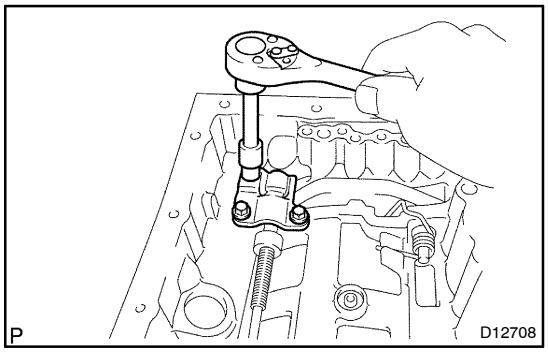
(a) Applying compressed air to the oil hole, remove the C_3 accumulator piston and the 2 springs.

(b) Remove the 2 O–rings from the piston.



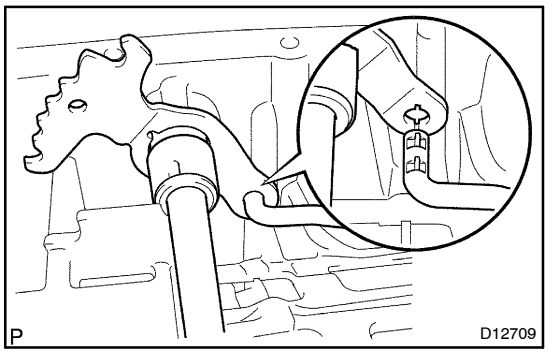
26. REMOVE C–1 ACCUMULATOR VALVE

(a) Remove the C_1 accumulator valve and the 2 springs.



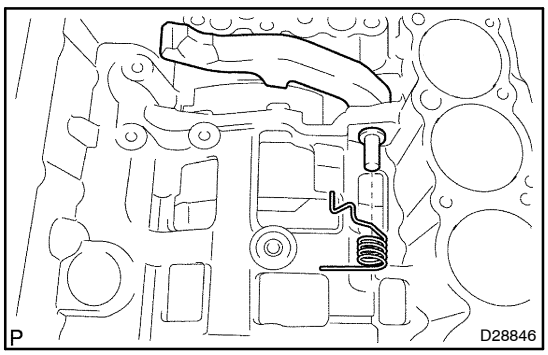
27. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 3 bolts and the parking lock pawl bracket.



28. REMOVE PARKING LOCK ROD SUB–ASSY

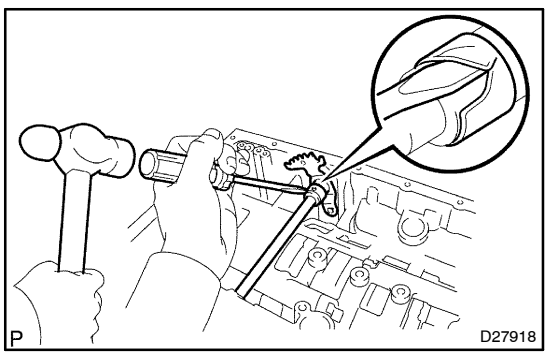
(a) Disconnect the parking lock rod from the manual valve lever.



29. REMOVE PARKING LOCK PAWL SHAFT

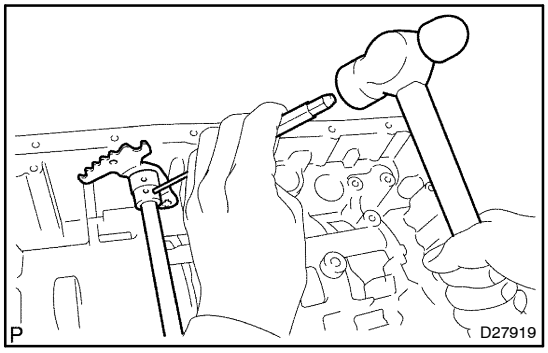
(a) Pull out the parking lock pawl shaft from the front side, then remove the lock pawl and the spring.

(b) Remove the E–ring from the shaft.



30. REMOVE MANUAL VALVE LEVER SUB–ASSY

(a) Using a hammer and a screwdriver, cut off the spacer and remove it from the shaft.

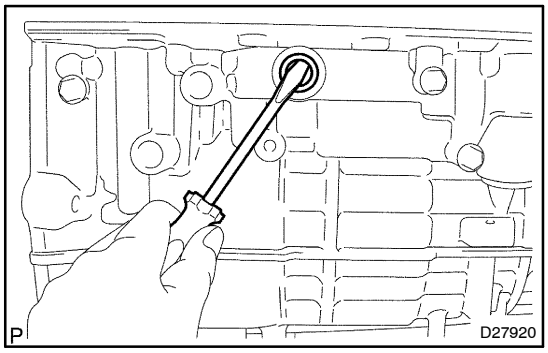


(b) Using a pin punch and a hammer, drive out the spring pin.

HINT:

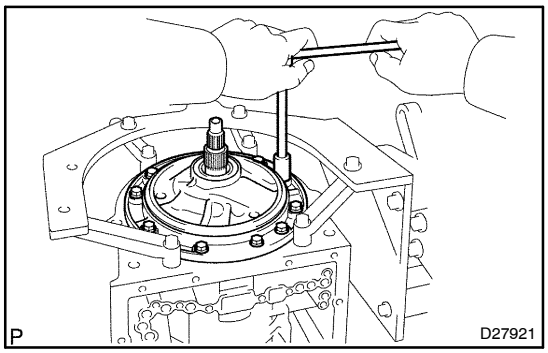
Slowly drive out the spring pin so that it does not fall into the transmission case.

(c) Pull the manual valve lever shaft out through the case, and remove the manual valve lever.



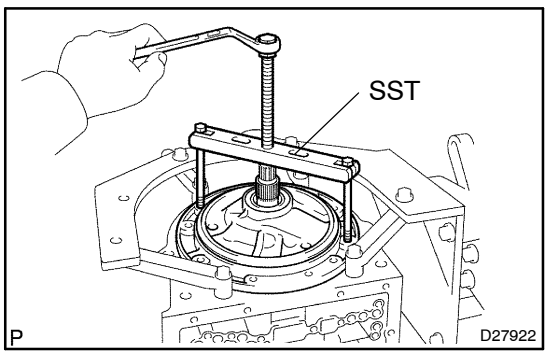
31. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, remove the 2 oil seals.

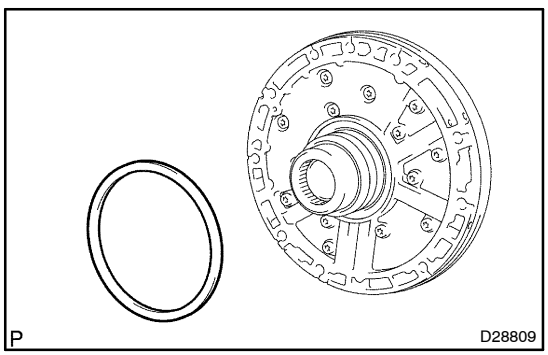


32. REMOVE OIL PUMP ASSY

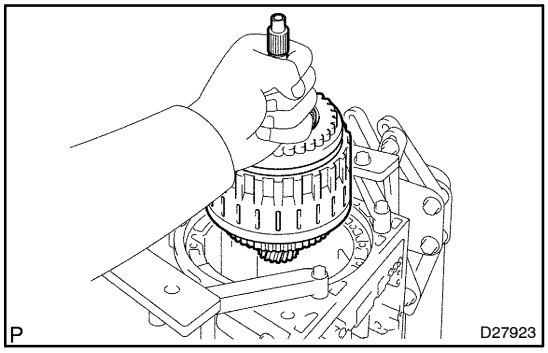
(a) Remove the 10 bolts holding the oil pump from the transmission case.



(b) Using SST, remove the oil pump.
SST 09350–30020 (09350–07020)

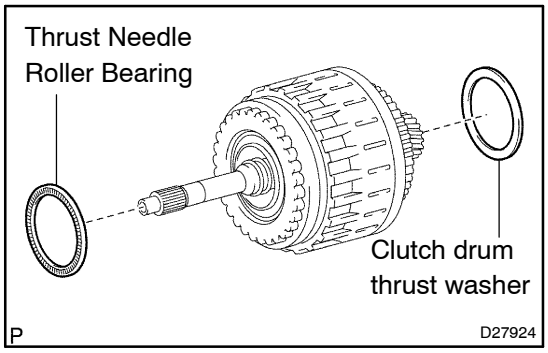


(c) Remove the thrust bearing race No.1 from the front oil pump.

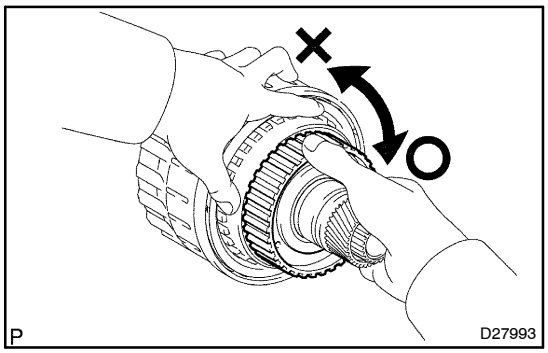


33. REMOVE CLUTCH DRUM & INPUT SHAFT ASSY

(a) Remove the clutch drum & input shaft drum assy from the transmission case.



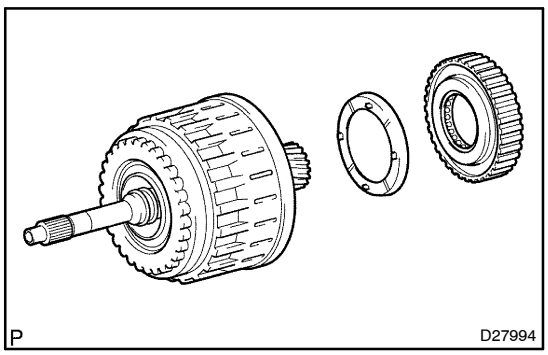
(b) Remove the clutch drum thrust washer and the thrust needle roller bearing.



34. INSPECT 1 WAY N0.2 CLUTCH ASSY

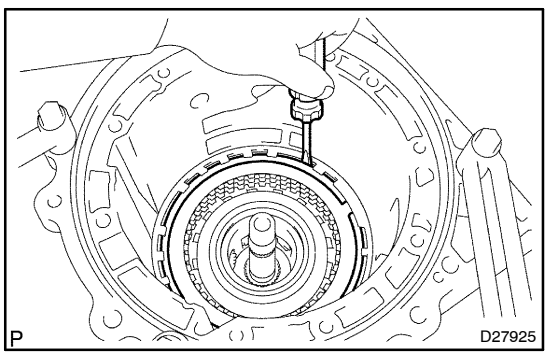
(a) Hold the Reverse clutch hub and turn the 1 Way clutch assy No.2.

(b) The 1 Way clutch assy No.2 turns freely clockwise and locks counterclockwise.



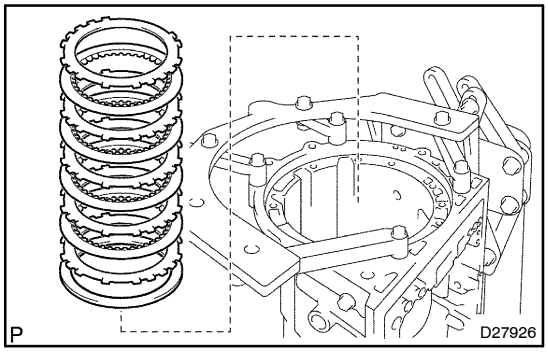
35. REMOVE 1 WAY N0.2 CLUTCH ASSY

(a) Remove the 1 Way clutch assy No.2 and clutch drum thrust washer No.2 from the clutch drum and input shaft assy.



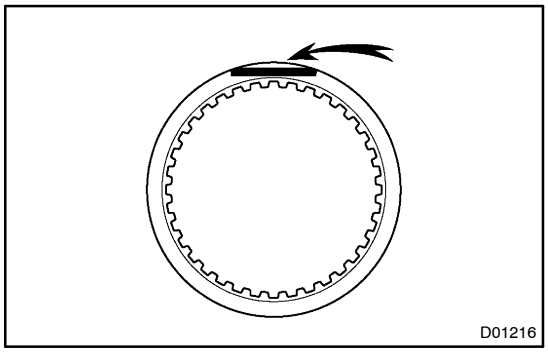
36. REMOVE BRAKE NO.3 SNAP RING

(a) Using a screwdriver, remove the brake No.3 snap ring from the case.



37. REMOVE BRAKE DISC NO.3

(a) Remove the flange and cusion plate the 4 discs and the 4 plates from the case.



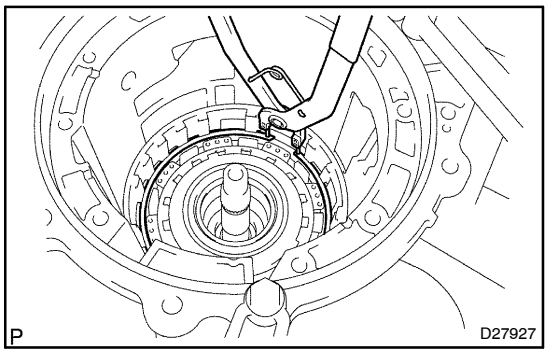
38. INSPECT BRAKE DISC NO.3

(a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt.

If necessary, replace them.

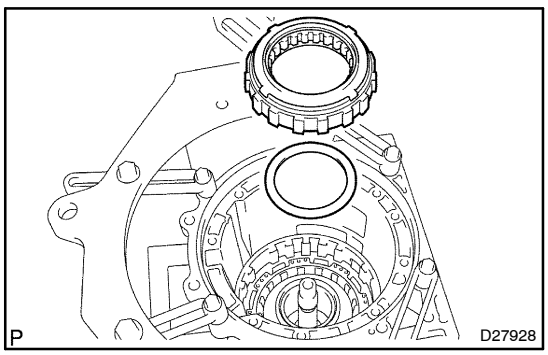
NOTICE:

- **If the lining of the disc is peeled off or discolored, or even if only a part of the print numbers is damaged, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**



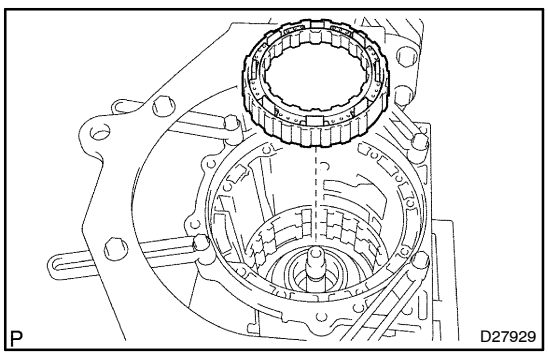
39. REMOVE 2ND BRAKE PISTON HOLE SNAP RING

(a) Using SST, remove the snap ring.
SST 09350–30020 (09350–07060)



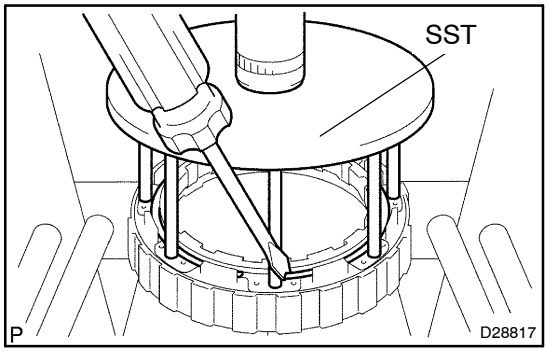
40. REMOVE 1 WAY CLUTCH ASSY

(a) Remove the 1 way clutch assy and the planetary carrier thrust washer No.1 from the case.



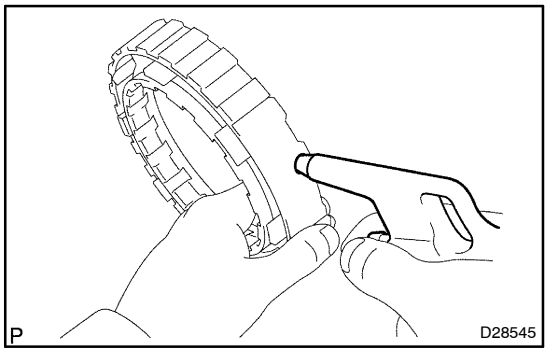
41. REMOVE 2ND BRAKE CYLINDER

(a) Remove the 2nd brake cylinder from the case.

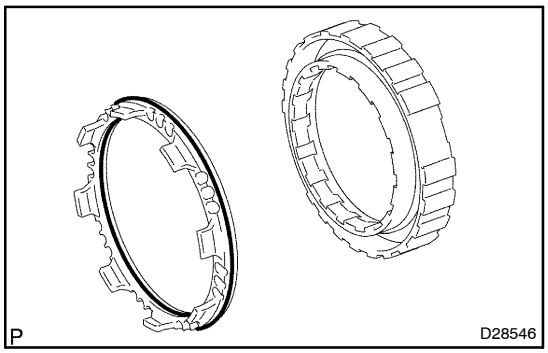


42. REMOVE 2ND BRAKE PISTON

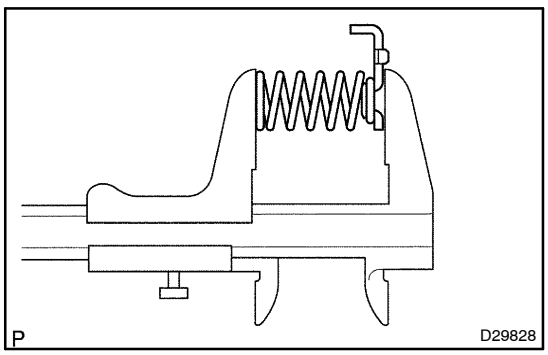
(a) Using SST and a press, remove the snapring.
SST 09351–40010



(b) Hold the 2nd brake piston and apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the 2nd brake cylinder to remove the 2nd brake piston.

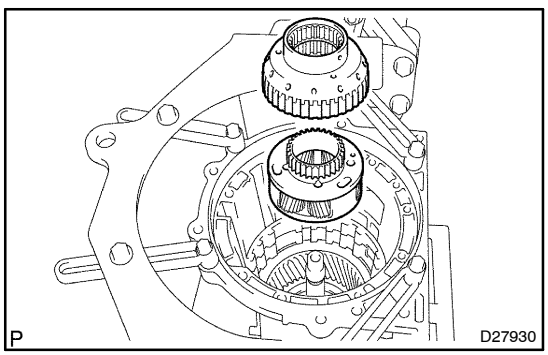


(c) Remove the 2 O–rings from the 2nd brake piston.



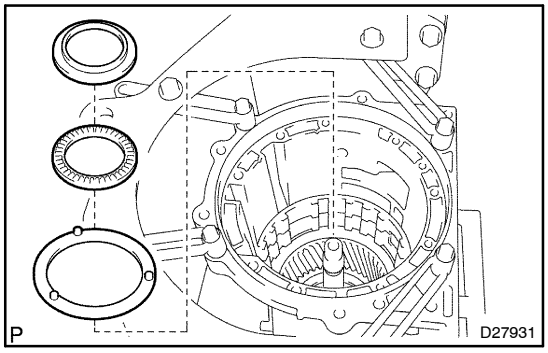
43. INSPECT BRAKE PISTON RETURN SPRING SUB–ASSYNO.3

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 15.72 mm (0.619 in.)

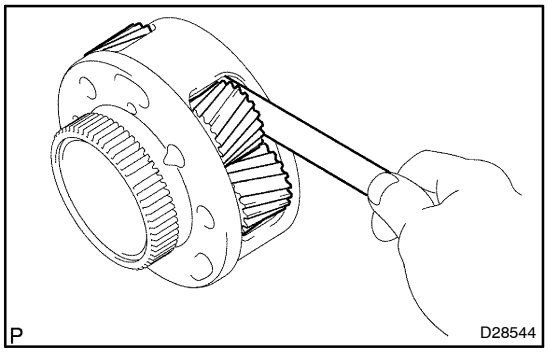


44. REMOVE FRONT PLANETARY GEAR ASSY

(a) Remove the front planetary gear assy and the 1 way clutch inner race from the case.



(b) Remove the thrust needle roller bearing, the thrust bearing race No.3 and the planetary carrier thrust washer No.2 from the front planetary gear assy.

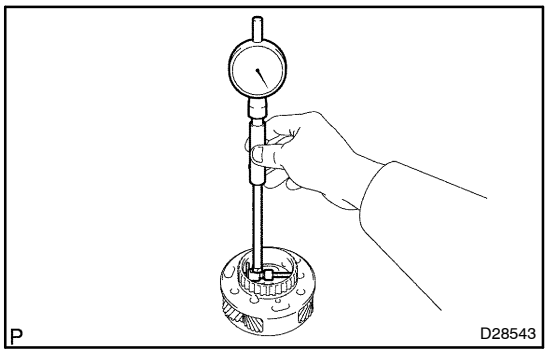


45. INSPECT FRONT PLANETARY GEAR ASSY

(a) Using a feeler gauge, measure the front planetary pinion gear thrust clearance.

Standard clearance: 0.20 – 0.60 mm (0.008 –0.024 in.)
Maximum clearance: 0.65 mm (0.026 in.)

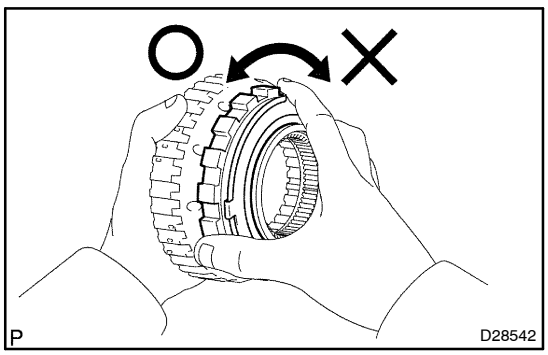
If the clearance is greater than the maximum, replace the front planetary gear assembly.



(b) Using a dial indicator, measure the inside diameter of the front planetary gear bushing.

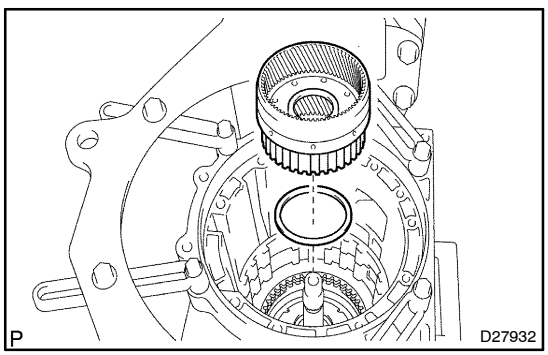
Maximum inside diameter: 57.48 mm (2.263 in.)

If the inside diameter is greater than the maximum, replace the front planetary gear.



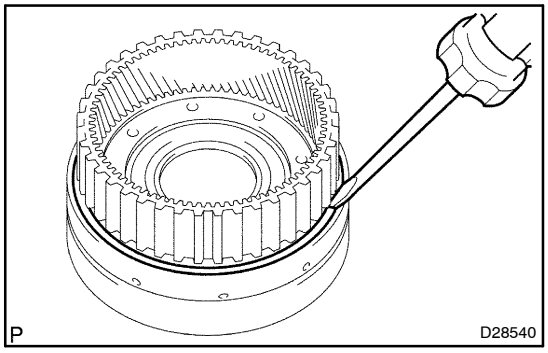
46. INSPECT 1 WAY CLUTCH ASSY

(a) Install the 1 way clutch assy to .1 way clutch inner race.
(b) Hold the 1 way clutch inner race and turn the 1 way clutch assy.
(c) Check that the 1 way clutch assy turns freely counterclockwise and locks clockwise.
(d) Remove the 1 way clutch assy from 1 way clutch inner race.



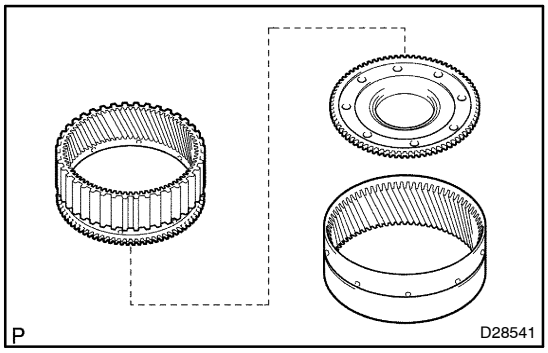
47. REMOVE FRONT PLANETARY RING GEAR

(a) Remove the front planetary ring gear and the bearing from the transmission case.

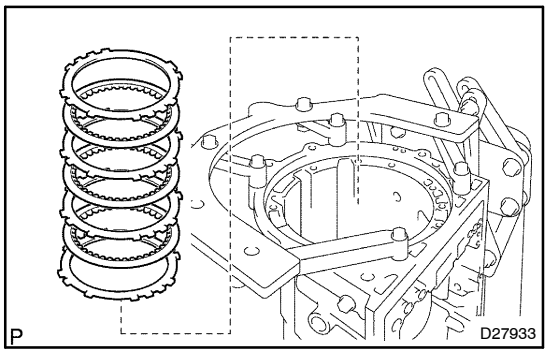


48. REMOVE CTR PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring.

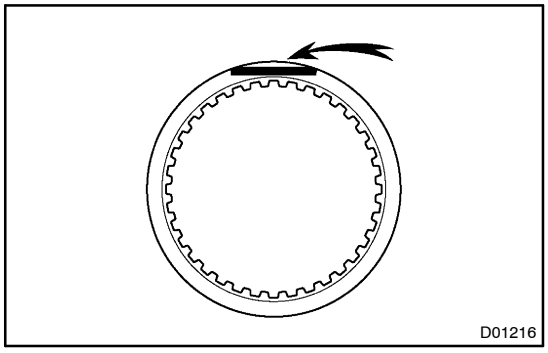


(b) Remove the CTR planetary ring gear and the front planetary ring gear flange from the front planetary ring gear.



49. REMOVE BRAKE DISC NO.1

(a) Remove the flange, the 3 discs and the 3 plates from the case.



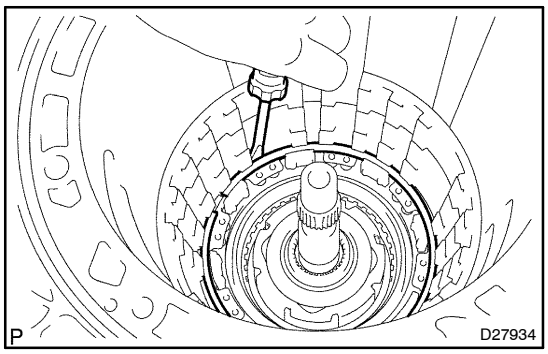
50. INSPECT BRAKE DISC NO.1

(a) Check whether if the sliding surface of the disc, the plate and the flange are worn or burnt.

If necessary, replace them.

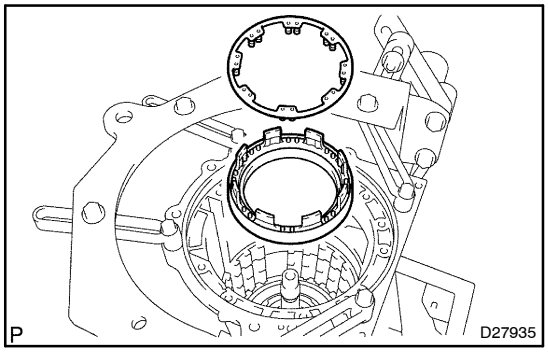
NOTICE:

- **If the lining of the disc is peeled off or discolors, or even if a part of the groove is damaged, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**



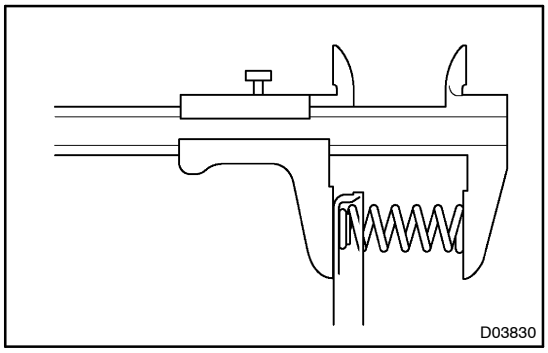
51. REMOVE BRAKE PISTON RETURN SPRING SNAP RING

(a) Using a screwdriver, remove the brake piston return spring snap ring from the case.



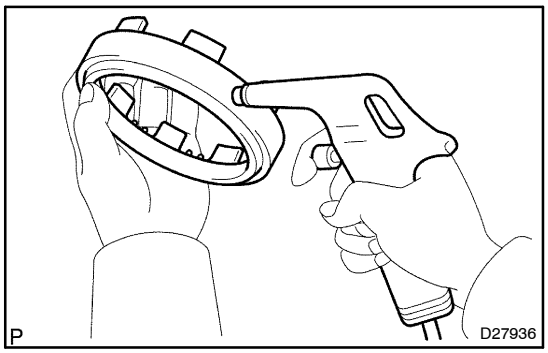
52. REMOVE BRAKE PISTON RETURN SPRING SUB–ASSY

(a) Remove the brake piston return spring and the brake piston No.1 with the brake cylinder No.1 from the transmission case.



53. INSPECT BRAKE PISTON RETURN SPRING SUB–ASSY

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 17.05 mm (0.671 in.)

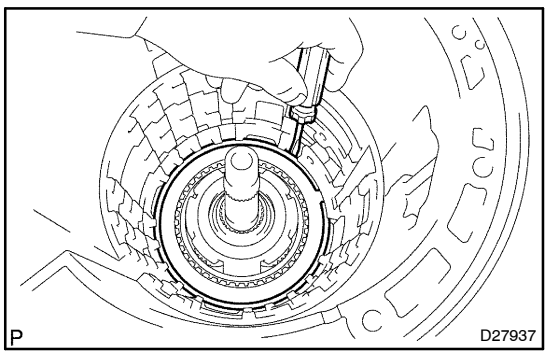


54. REMOVE BRAKE PISTON NO.1

(a) Hold the brake piston No.1 and apply compressed air (392 kPa, 4 kgf/cm^2, 57 psi) to the transmission case to remove the brake piston No. 1.

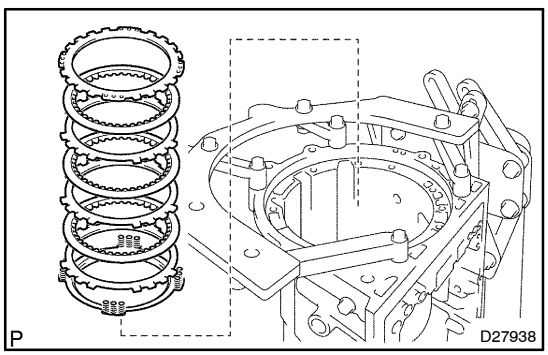
HINT:
If the piston dose not pop out with compressed air, lift the piston out with needle–nose pliers.

(b) Remove the 2 O–rings from the brake piston No. 1.

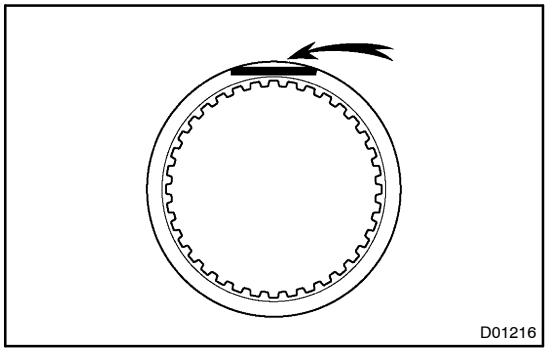


55. REMOVE BRAKE DISC NO.2

(a) Using a screwdriver, remove the snap ring from the case.



(b) Remove the flange, the brake piston return spring, the 3 discs and the 3 plates from the case.



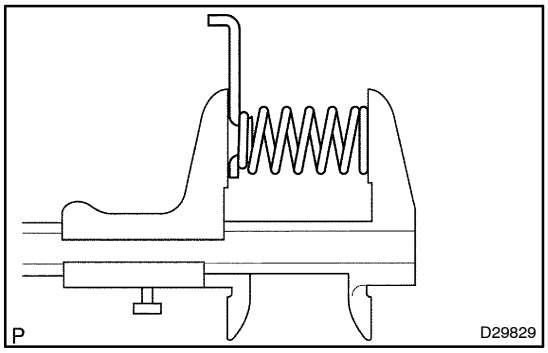
56. INSPECT BRAKE DISC NO.2

(a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt.

If necessary, replace them.

NOTICE:

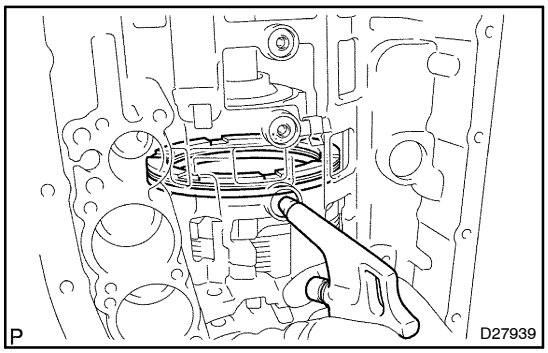
- **If the lining of the disc is peeled off or discolor, or even if only a part of the print numbers is damaged, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**



57. INSPECT BRAKE PISTON RETURN SPRING SUB–ASSYNO.2

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 17.45 mm (0.687 in.)



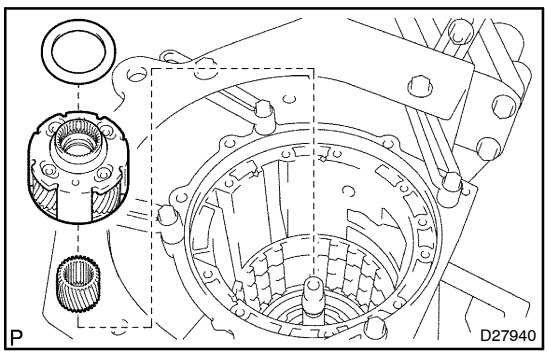
58. REMOVE BRAKE PISTON NO.2

(a) Hold the brake piston No.2 and apply compressed air (392 kPa, 4 kgf/cm^2, 57 psi) to the transmission case to remove the brake piston No. 2.

HINT:

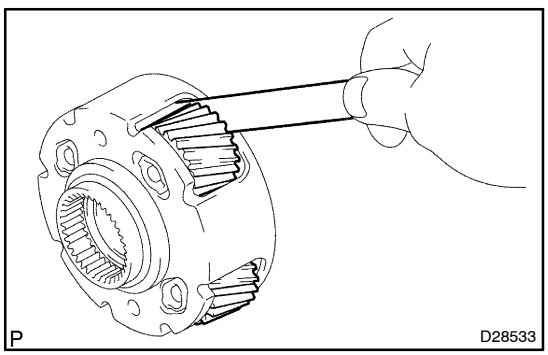
If the piston dose not pop out with compressed air, lift the piston out with needle–nose pliers.

(b) Remove the 2 O–rings from the brake piston No. 2.



59. REMOVE CTR PLANETARY GEAR ASSY

(a) Remove the CTR planetary gear assy, the planetary sun gear and the thrust bearing race No.4 from the case.



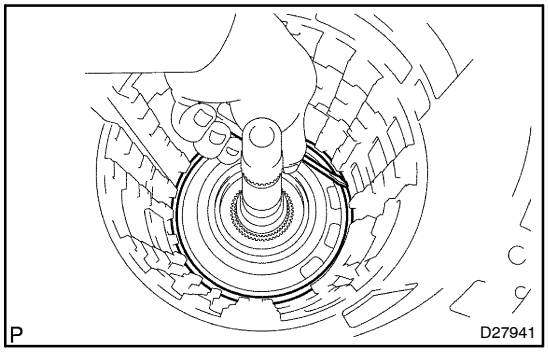
60. INSPECT CTR PLANETARY GEAR ASSY

(a) Using a feeler gauge, measure the CTR planetary gear pinion thrust clearance.

Standard clearance: 0.12 – 0.68 mm (0.005 – 0.027 in.)

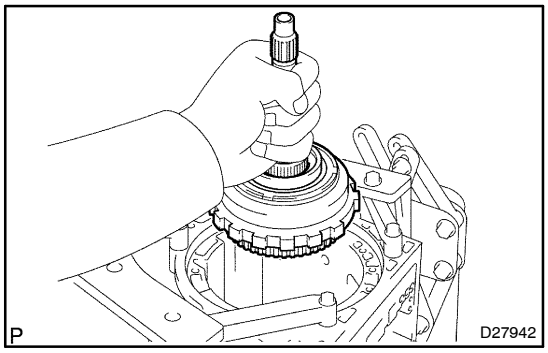
Maximum clearance: 0.73 mm (0.029 in.)

If the clearance is greater than the maximum, replace the CTR planetary gear assy.

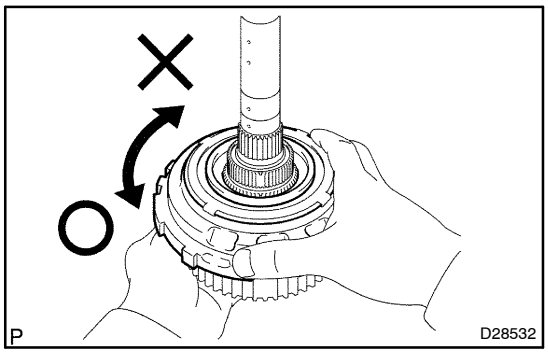


61. REMOVE INTERMEDIATE SHAFT

(a) Using a screwdriver, remove the snap ring from the case.



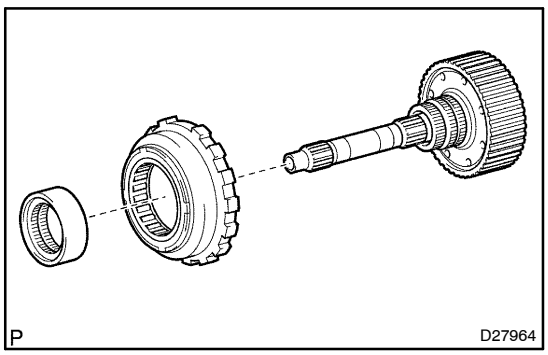
(b) Remove the intermediate shaft with the 1way clutch assy No.3 from the case.



62. INSPECT 1WAY NO.3 CLUTCH ASSY

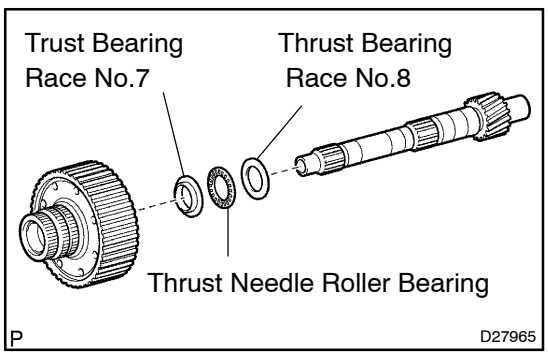
(a) Hold the RR planetary ring gear flange sub assy and turn the 1 way clutch assy.

(b) Check that the 1 way clutch assy turns freely counterclockwise and locks clockwise .



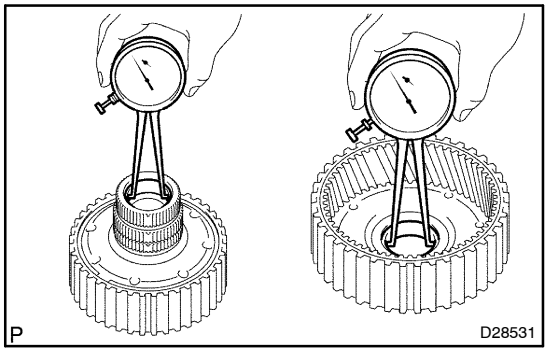
63. REMOVE 1WAY NO.3 CLUTCH ASSY

(a) Remove the 1way clutch assy No.3 and the 1way clutch inner race from the intermediate shaft.



64. REMOVE RR PLANETARY RING GEAR FLANGE SUB–ASSY

(a) Remove the thrust bearing race No.8, the thrust needle rollerbearing, the thrust bearing race No.7 and the planetary ring gear flange from the intermediate shaft.

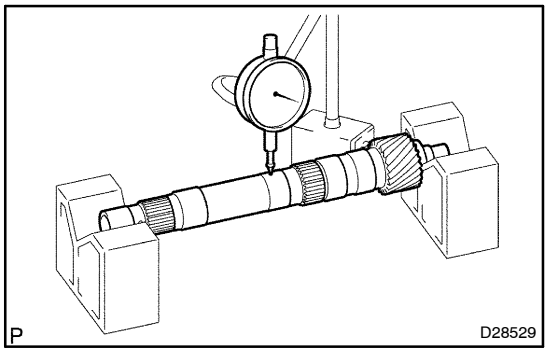


65. INSPECT RR PLANETARY RING GEAR FLANGE SUB–ASSY

(a) Using a dial indicator, measure the inside diameter of the RR planetary ring gear bushing.

Maximum inside diameter: 32.175 mm (1.267 in.)

If the inside diameter is greater than the maximum, replace the RR planetary ring gear.



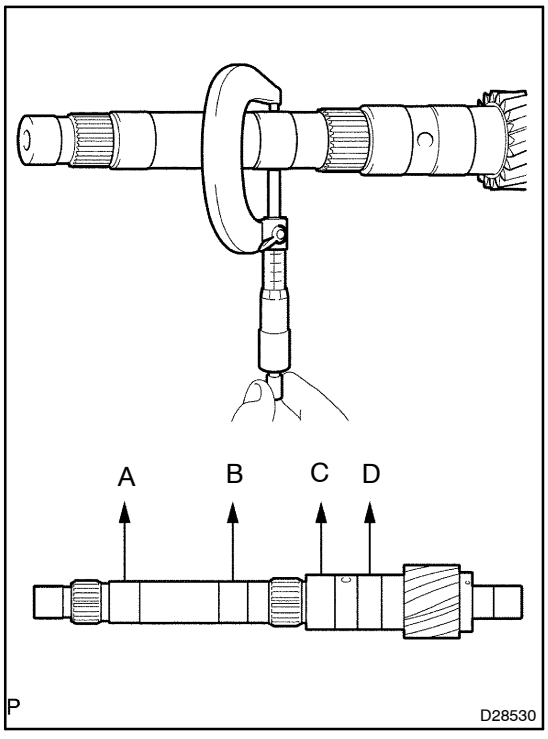
66. INSPECT INTERMEDIATE SHAFT

(a) Using a dial indicator, check the intermediate shaft runout.

Maximum runout: 0.08 mm (0.003 in.)

NOTICE:

If the bend exceeds the specification, replace the intermediate shaft with a new one.



(b) Using a micrometer, check the outer diameter of the intermediate shaft positions shown in the diagram.

Standard diameter:

A: 25.962 – 25.975 mm (1.022 – 1.023 in.)

B: 25.962 – 25.975 mm (1.022 – 1.023 in.)

C: 32.062 – 32.075 mm(1.262 – 1.263 in.)

D: 32.062 – 32.075 mm (1.262 – 1.263 in.)

Minimum diameter:

A: 25.912 mm (1.020 in.)

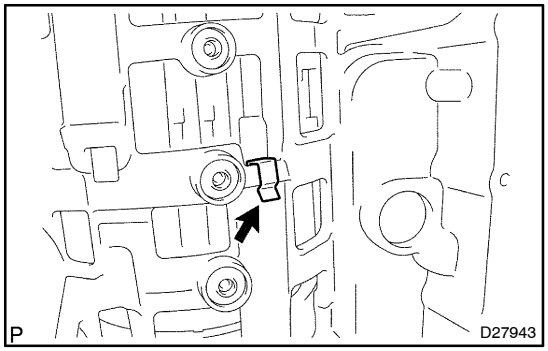
B: 25.912 mm (1.020 in.)

C: 32.012 mm (1.260 in.)

D: 32.012 mm (1.260 in.)

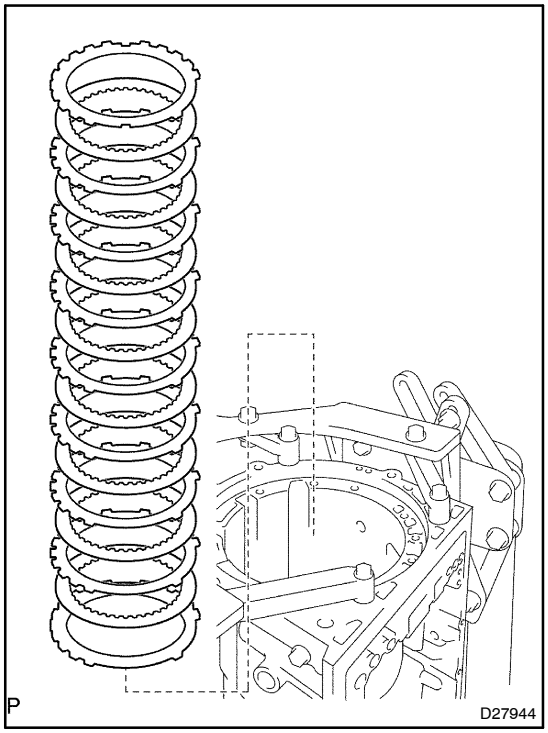
NOTICE:

If the outer diameter is outside the standard, replace the intermediate shaft with the new one.



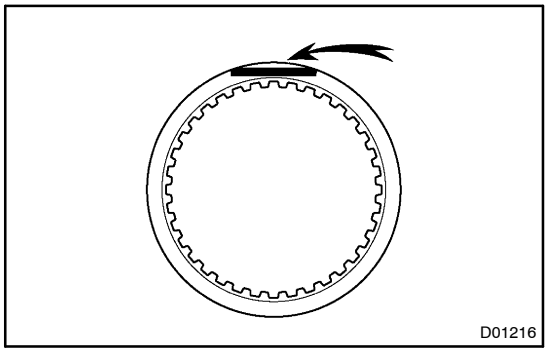
67. REMOVE BRAKE PLATE STOPPER SPRING

(a) Remove the brake plate stopper spring from the case.



68. REMOVE BRAKE DISC NO.4

(a) Remove the 7 plates, the 8 discs and the 2 flanges from the case.



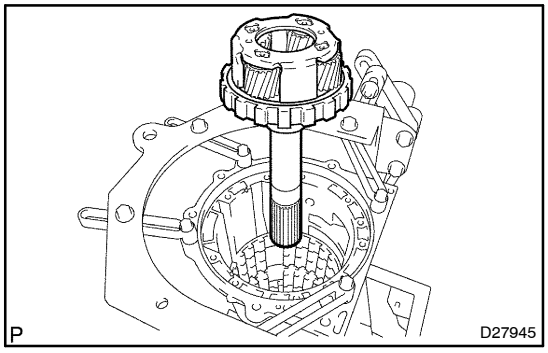
69. INSPECT BRAKE DISC NO.4

(a) Check whether if the sliding surface of the disc, the plate and the flange are worn or burnt.

If necessary, replace them.

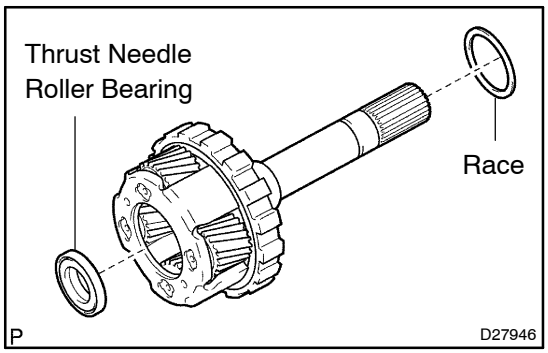
NOTICE:

- **If the lining of the disc is peeled off or discolor, or even if only a part of the print numbers is damaged, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**

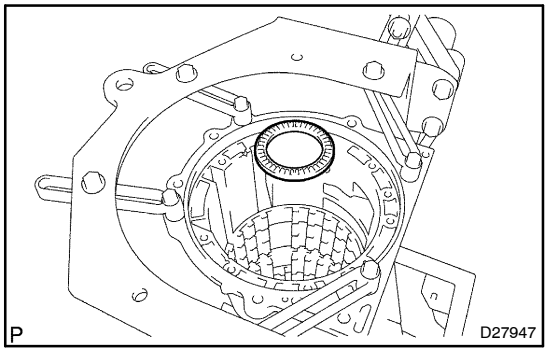


70. REMOVE REAR PLANETARY GEAR ASSY

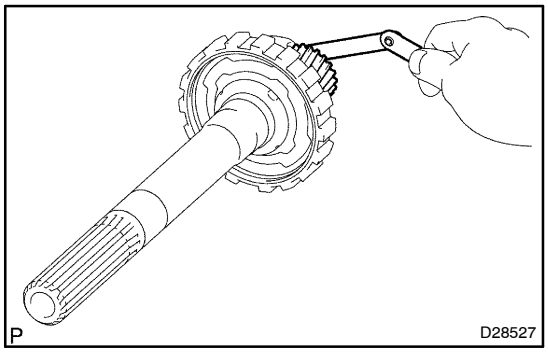
(a) Remove the rear planetary gear assy from the case.



(b) Remove the thrust bearing race No.9 and the thrust needle roller bearing from the rear planetary gear assy.



(c) Remove the thrust needle roller bearing from the case.



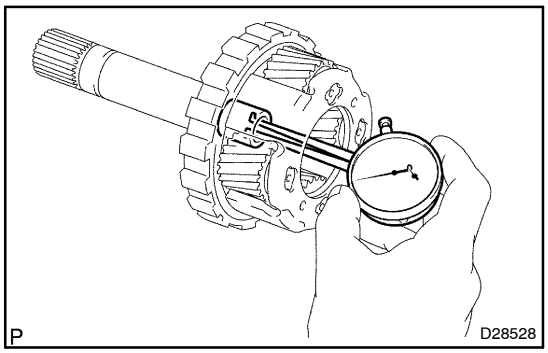
71. INSPECT REAR PLANETARY GEAR ASSY

(a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 0.65 mm (0.026 in.)

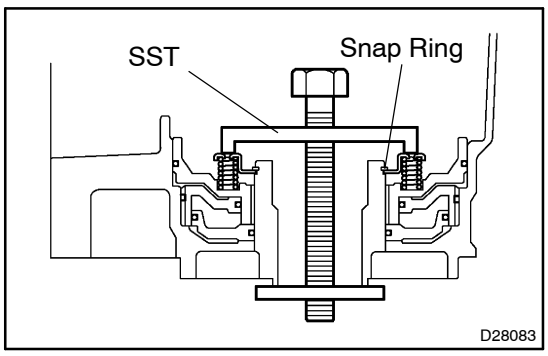
If the clearance is greater than the maximum, replace the planetary gear assy.



(b) Using a dial indicator, measure the inside diameter of the rear planetary gear bushing.

Maximum inside diameter: 20.075 mm (0.790 in.)

If the inside diameter is greater than the maximum, replace the rear planetary gear assy.



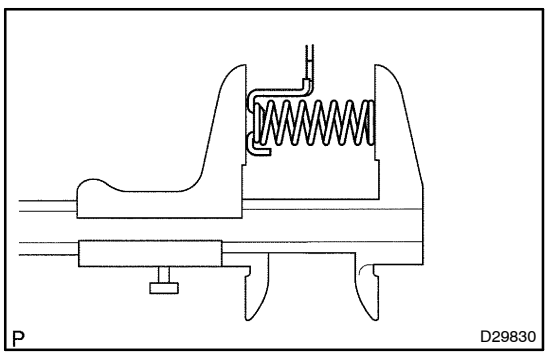
72. REMOVE 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Place SST on the spring retainer and compress the brake return spring.

SST 09350–30020 (09350–07050)

(b) Using SST, remove the snap ring and the brake return spring.

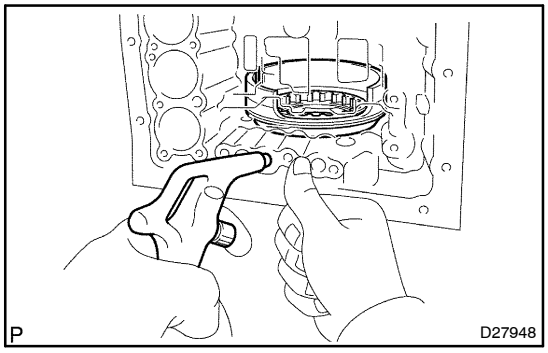
SST 09350–30020 (09350–07070)



73. INSPECT 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 23.74 mm (0.935 in.)



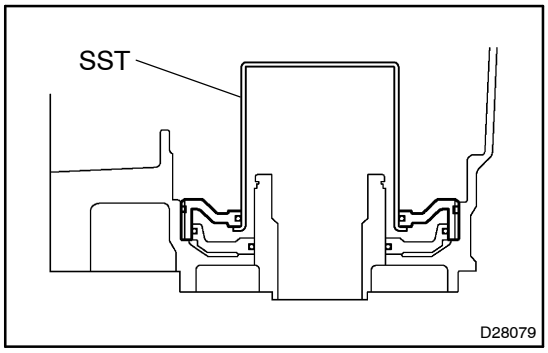
74. REMOVE 1ST & REVERSE BRAKE PISTON

(a) Hold the No.2 brake piston and apply compressed air (392 kPa, 4 kgf/cm^2, 57 psi) to the transmission case to remove the brake piston No. 2.

HINT:

If the piston dose not pop out with compressed air, lift the piston out with needle–nose pliers.

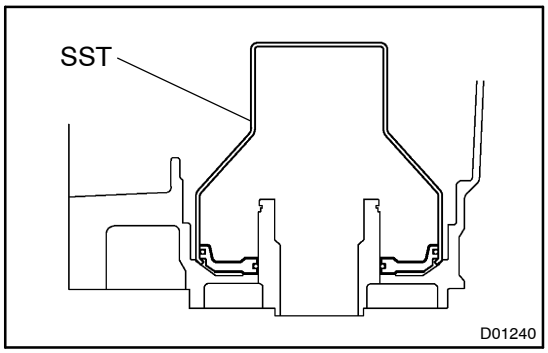
(b) Remove the O–ring from brake piston No. 2.



75. REMOVE BRAKE REACTION SLEEVE

(a) Using SST, remove the reaction sleeve.
SST 09350–30020 (09350–07080)

(b) Remove the O–ring from the reaction sleeve.

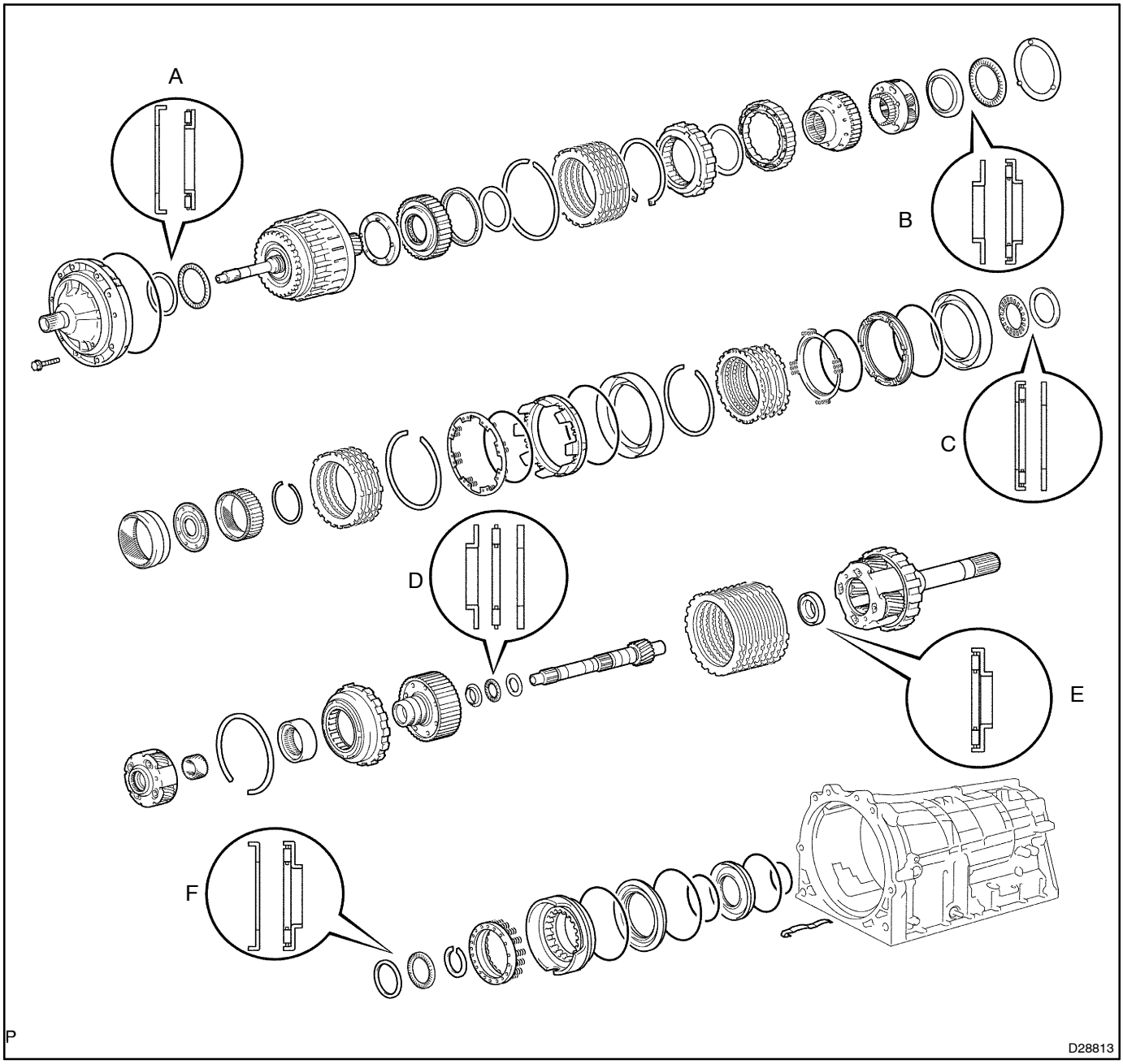


76. REMOVE BRAKE PISTON NO.4

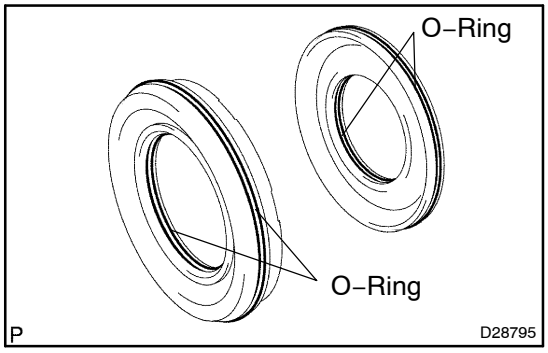
(a) Using SST, remove the brake piston No. 2.
SST 09350–30020 (09350–07090)

(b) Remove the 2 O–rings from the piston No. 2.

77. BEARING POSITION



Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	73.6 (2.898) / 102.0 (4.016)	71.9 (2.831) / 85.6 (3.370)	–
B	38.0 (1.496) / 57.0 (2.244)	43.4 (1.709) / 58.3 (2.295)	–
C	–	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
D	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
E	–	21.5 (0.847) / 40.8 (1.606)	–
F	48.5 (1.909) / 62.7 (2.469)	45.9 (1.807) / 64.0 (2.520)	–

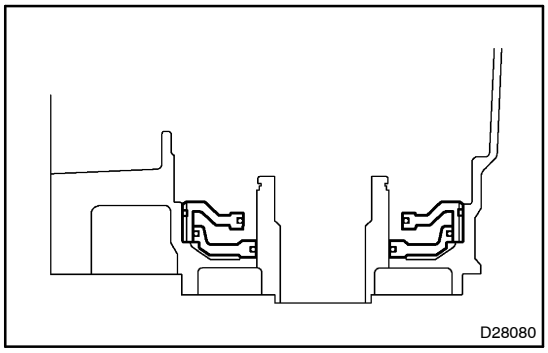


78. INSTALL BRAKE PISTON NO.4

(a) Coat 2 new O–rings with ATF, and install them to the brake reaction sleeve.

(b) Coat 2 new O–rings with ATF, and install them to the brake piston No. 4.

(c) Install the brake piston No. 4 to the reaction sleeve.



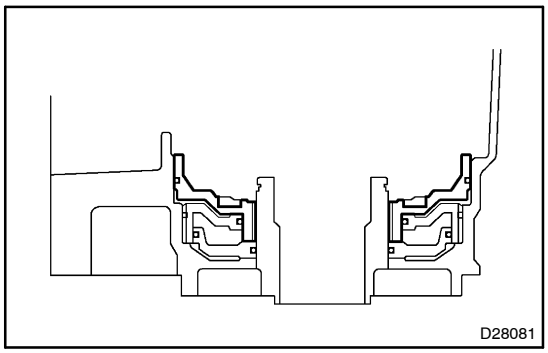
79. INSTALL BRAKE REACTION SLEEVE

(a) Coat new O–ring with ATF, and install it to the reaction sleeve.

(b) With the brake piston No.1 underneath (the rear side), install the brake reaction sleeve and the brake piston No.1 to the transmission case.

NOTICE:

Be careful not to damage the O–rings.



80. INSTALL 1ST & REVERSE BRAKE PISTON

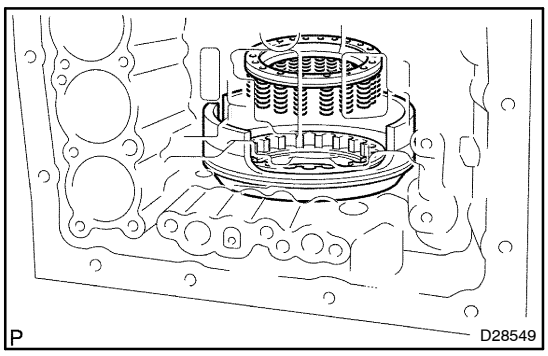
(a) Coat a new O–ring with ATF.

(b) Install the O–ring on the 1st & reverse brake piston .

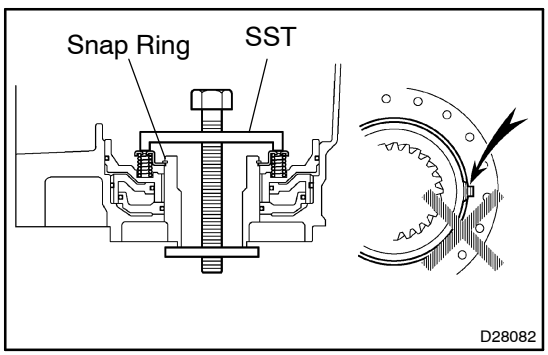
(c) With the spring seat of the piston facing upwards (the front side), place the piston in the transmission case.

NOTICE:

Be careful not to damage the O–ring.



(d) Place the piston return spring onto the brake piston No.4.



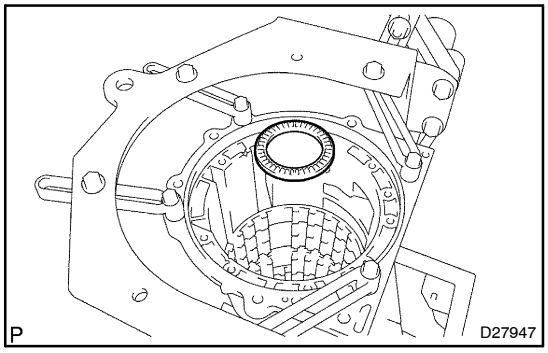
81. INSTALL 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Place SST on the spring retainer, and compress the return spring.

SST 09350–30020 (09350–07050)

(b) Using SST, install the snap ring.

SST 09350–30020 (09350–07070)

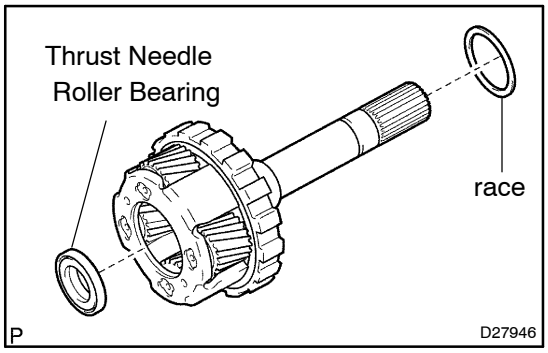


82. INSTALL REAR PLANETARY GEAR ASSY

(a) Install the thrust needle roller bearing.

Thrust needle roller bearing diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	45.9 (1.807)	64.0 (2.520)

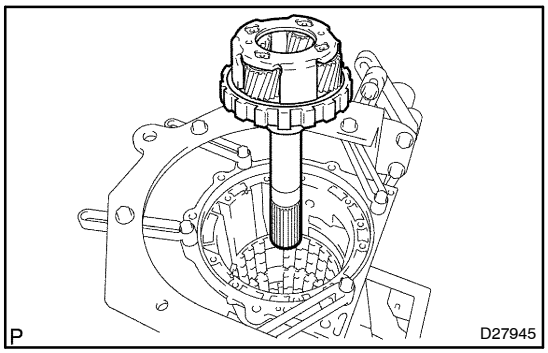


(b) Install the thrust needle roller bearing.

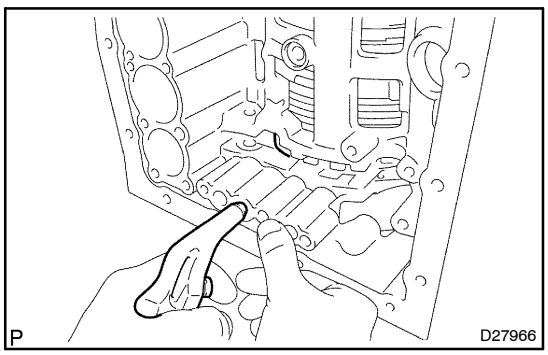
(c) Coat the thrust bearing race No.9 with petroleum jelly, and install it onto the rear planetary ring gear.

Bearing & race diameter: mm (in.)

	Inside	Outside
Bearing	21.5 (0.847)	40.8 (1.606)
Race	48.5 (1.909)	62.7 (2.469)

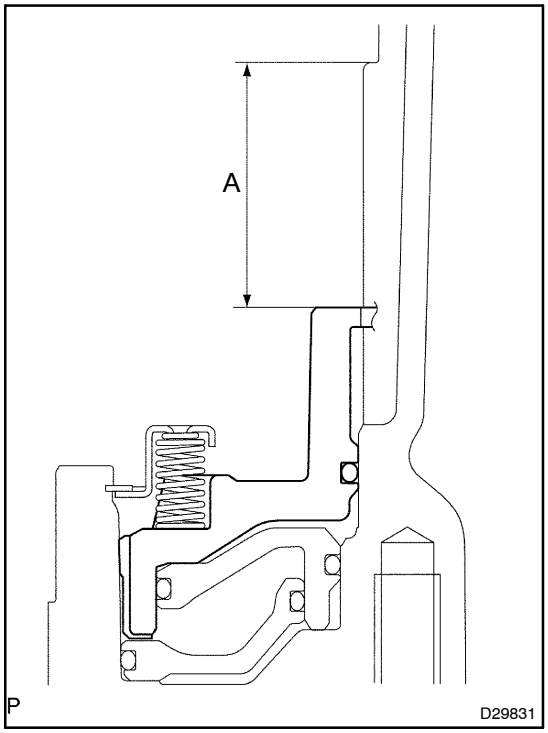


(d) Install the rear planetary gear assy.



83. INSPECT PACK CLEARANCE OF FIRST & REVERSE BRAKE

(a) Make sure the 1st & reverse brake pistons move smoothly when applying and releasing the compressed air into the transmission case.



(b) Using vernier calipers, measure the level difference (length A) between the upper surface of the 1st & reverse brake piston and the hitting surface of the brake flange No.4 at the both end across a diameter, and calculate the average.

NOTICE:

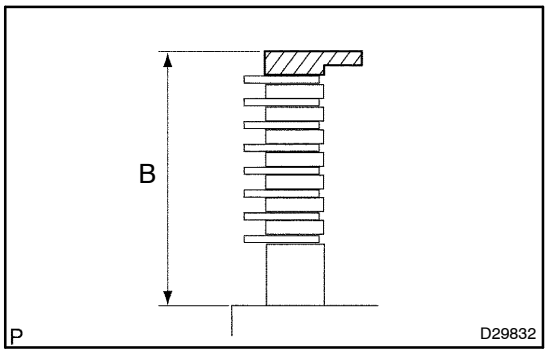
The 1st & reverse brake piston must be installed tightly to the end face of the transmission case.

HINT:

Length A = 36.35 – 37.09 mm

H thickness: mm (in.)

No.	Thickness	No.	Thickness
0	0 (0)	8	0.8 (0.03150)
2	0.2 (0.00787)	10	1.0 (0.03937)
4	0.4 (0.01575)	12	1.2 (0.04724)
6	0.6 (0.02362)	14	1.4 (0.05512)



(c) Using vernier calipers, measure the thickness (length B) of the 2 brake flanges, the 7 brake plates No.4 and the 8 brake discs No.4 altogether at the both end across a diameter, and calculate the average.

Pack Clearance: 0.8 – 1.1 mm

HINT:

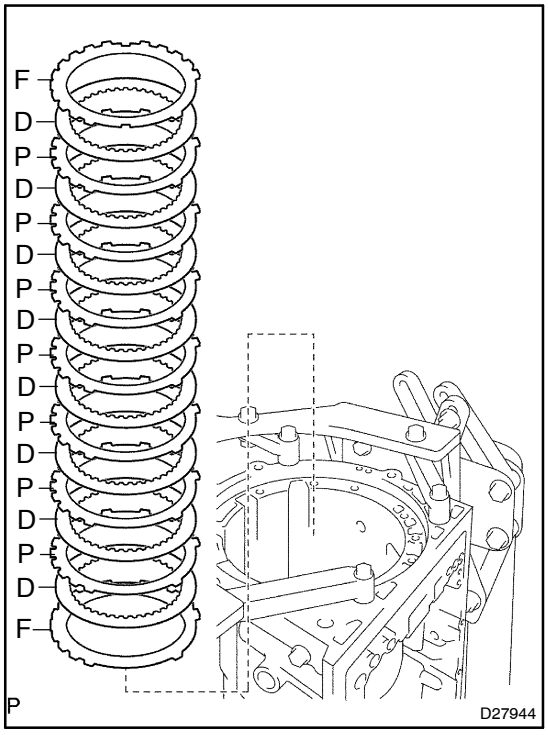
Pack Clearance = Length A – Length B – 0.25 – 1.8 mm

Length B = 36.04 – 37.14 mm

(d) If the pack clearance is outside the standard, select & install a brake flange that makes the pack clearance to be within the standard.

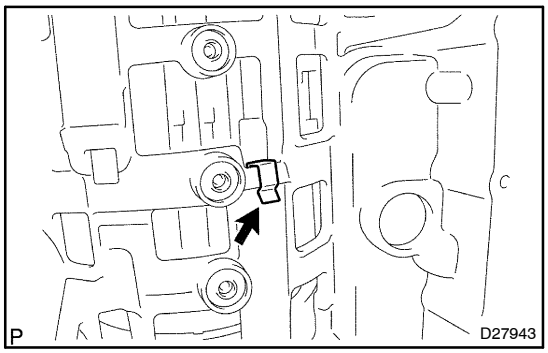
HINT:

Select the flange from 8 kinds (in thickness) of the selective flanges to adjust the pack clearance.



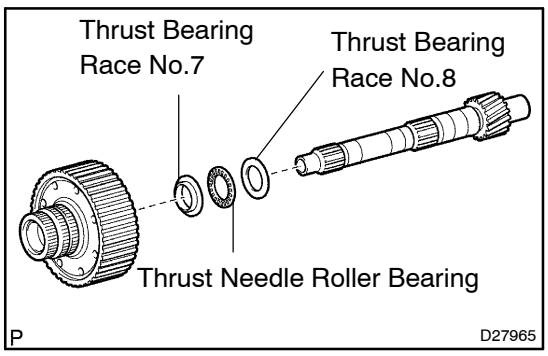
84. INSTALL BRAKE DISC NO.4

(a) Install the 7 plates, the 8 discs and the 2 flanges.
Install in order: P = Plate, D = Disc, F = Flange
F – D – P – D – P – D – P – D – P – D – P – D – P – D – P – D – F



85. INSTALL BRAKE PLATE STOPPER SPRING

(a) Install the brake plate stopper spring.

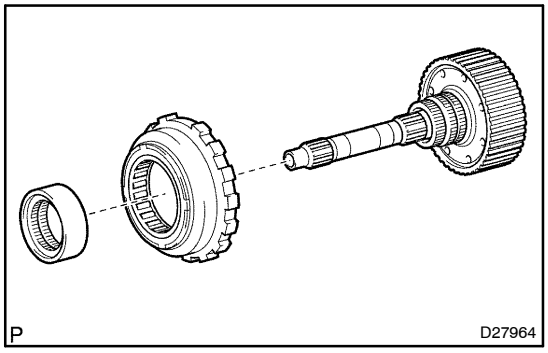


86. INSTALL RR PLANETARY RING GEAR FLANGE SUB–ASSY

(a) Install the thrust bearing race No.8, the thrust needle rollerbearing, the thrust bearing race No. 7 and the planetary ring gear flange to the intermediate shaft.

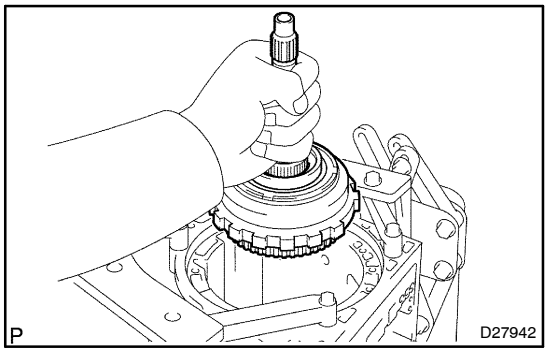
Bearing and race diameter mm (in.)

	Inside	Outside
Thrust bearing race No.7	33.4 (1.315)	49.0 (1.929)
Thrust needle roller bearing	32.1 (1.264)	49.35 (1.943)
Thrust bearing race No.8	32.1 (1.264)	49.0 (1.929)



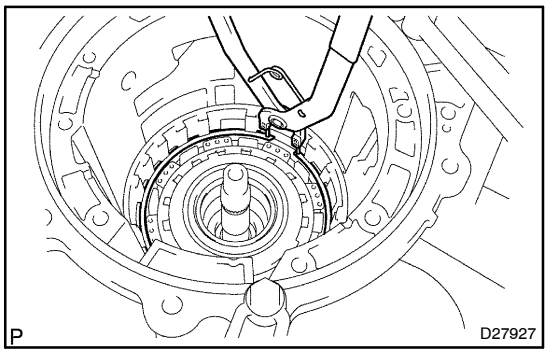
87. INSTALL 1WAY NO.3 CLUTCH ASSY

(a) Install the 1way clutch assy No.3 and the 1 way clutch inner race to the intermediate shaft.

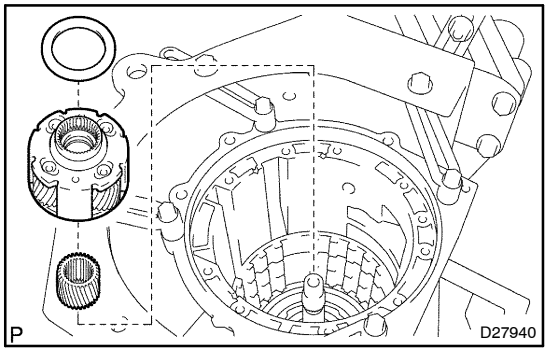


88. INSTALL INTERMEDIATE SHAFT

(a) Install the intermediate shaft with the 1 way clutch assy No.3 to the case.



(b) Using SST, install the snap ring.
SST 09350–30020 (09350–07050, 09350–07060)



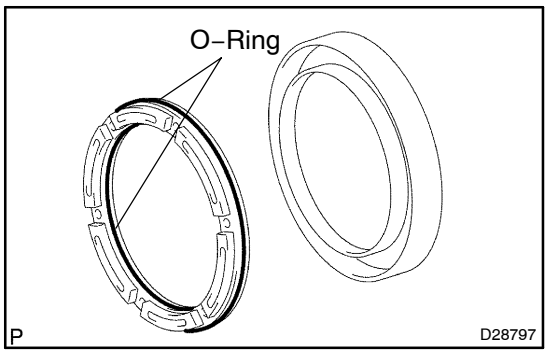
89. INSTALL CTR PLANETARY GEAR ASSY

(a) Install the center planetary gear assy and the planetary sun gear to the case.

(b) Coat the thrust bearing race with petroleum jelly, and install it onto the CTR planetary ring gear.

Race diameter: mm (in.)

	Inside	Outside
Race	53.7 (2.114)	74.0 (2.913)

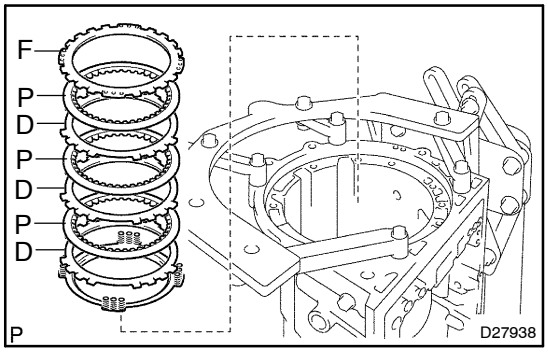


90. INSTALL BRAKE PISTON NO.2

(a) Coat 2 new O–rings with ATF, and install them to the brake piston No.2.

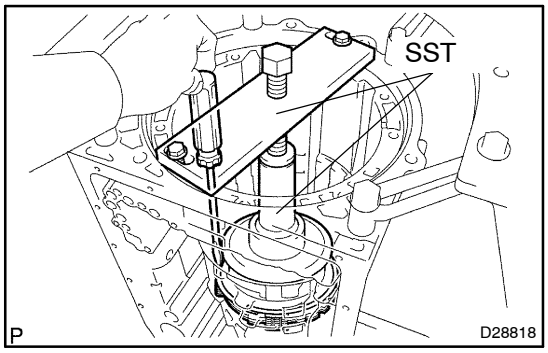
(b) Be careful not to damage the O–rings. Press the brake piston No.2 into the brake cylinder No.2 with both hands.

(c) Install the brake piston No.2 to the case.

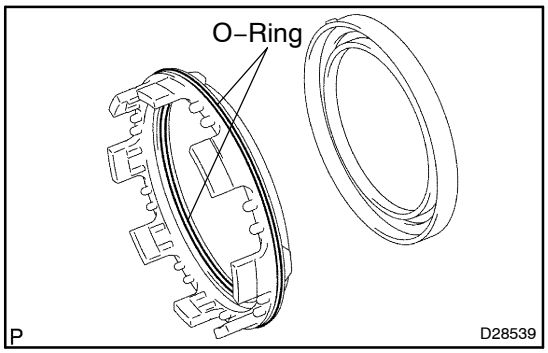


91. INSTALL BRAKE DISC NO.2

(a) Install the flange, the 3 plates, the 3 discs and the brake piston return spring.
Install in order: P = Plate, D = Disc, F=Flange
F – P – D – P – D – P – D



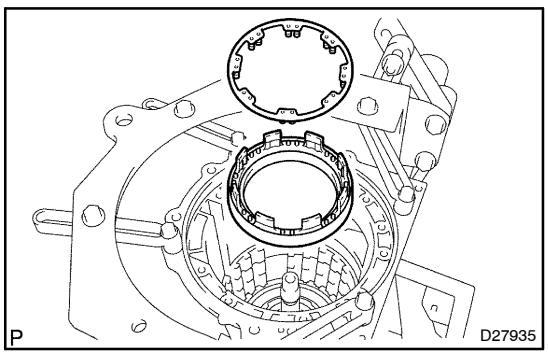
(b) Using SST and press, install the brake No.2 spring snap ring.
SST 09351–40010



92. INSTALL BRAKE PISTON NO.1

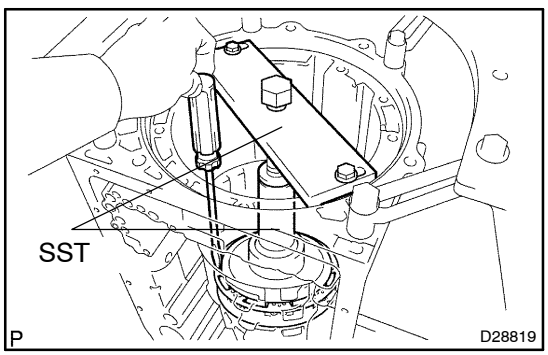
(a) Coat 2 new O–rings with ATF, and install them on the brake piston No.1,

(b) Be careful not to damage the O–rings. Press the brake piston No.1 into the brake cylinder No.1 with both hands.



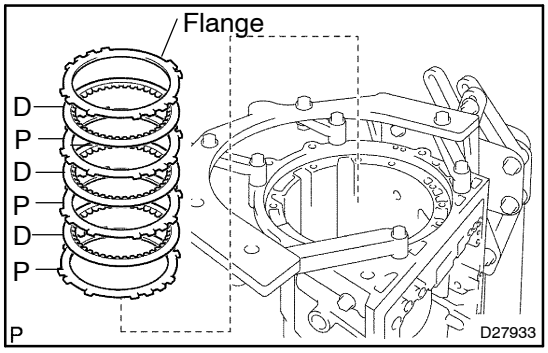
93. INSTALL BRAKE PISTON RETURN SPRING SUB–ASSY

(a) Install the brake piston return spring and the brake piston No.1 with the brake cylinder No.1 on the transmission case.



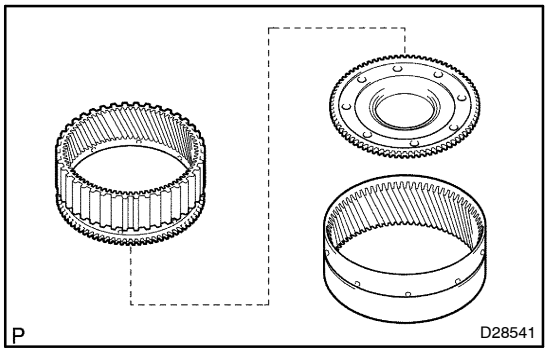
94. INSTALL BRAKE PISTON RETURN SPRING SNAP RING

(a) Using SST and press, install the brake piston return spring snap ring.
SST 09351–40010



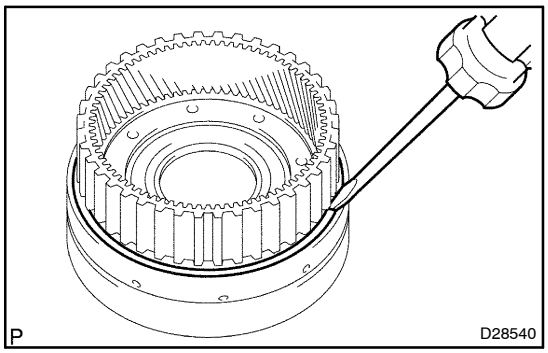
95. INSTALL BRAKE DISC NO.1

(a) Install the the 3 plates, the 3 discs and the flange.
Install in order: P = Plate, D = Disc, F = Flange
F – D – P – D – P – D – P – D – P – D – P – D

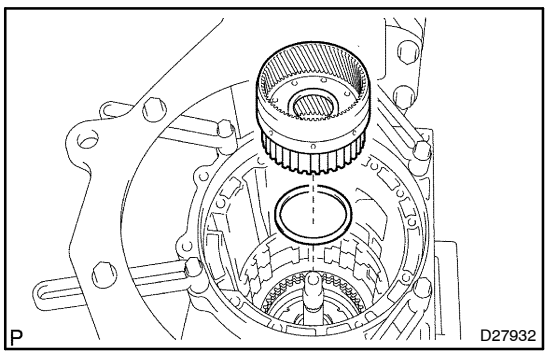


96. INSTALL CTR PLANETARY RING GEAR

(a) Install the CTR planetary ring gear and the front planetary ring gear flange on the front planetary ring gear.



(b) Using a screwdriver, Install the snap ring.

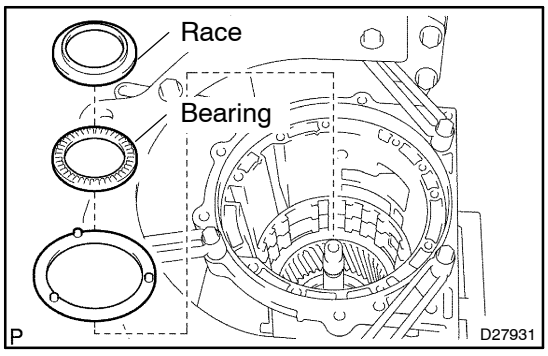


97. INSTALL FRONT PLANETARY RING GEAR

(a) Install the front planetary ring gear and the thrust needle roller bearing on the case.

Thrust needle roller bearing diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	55.7 (2.193)	76.4 (3.008)



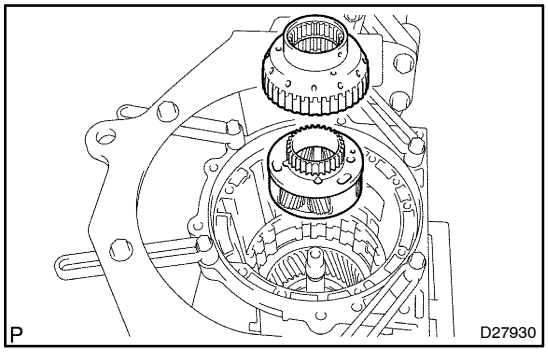
98. INSTALL FRONT PLANETARY GEAR ASSY

(a) Install the thrust needle roller bearing and the thrust washer.

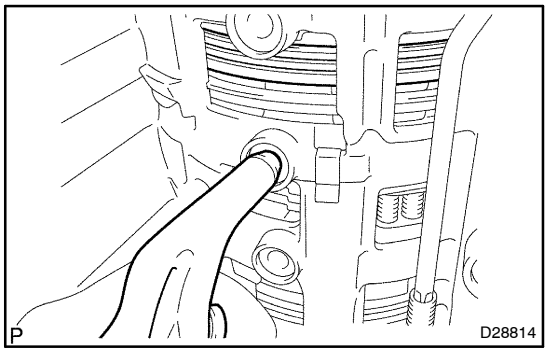
(b) Coat the thrust race with petroleum jelly, and install it onto the front planetary ring gear.

Thrust needle roller bearing and race diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	43.4 (1.709)	58.3 (2.295)
Race	38.0 (1.496)	57.0 (2.244)

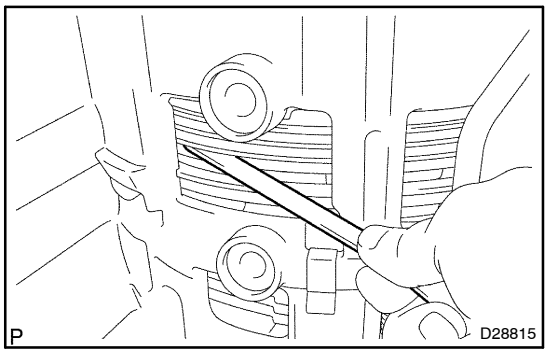


(c) Install the front planetary gear assy and the 1 way clutch inner race from the case.



99. INSPECT PISTON STROKE OF BRAKE PISTON NO.1

(a) Make sure the brake piston No.1 moves smoothly when applying and releasing the compressed air into the transmission case.



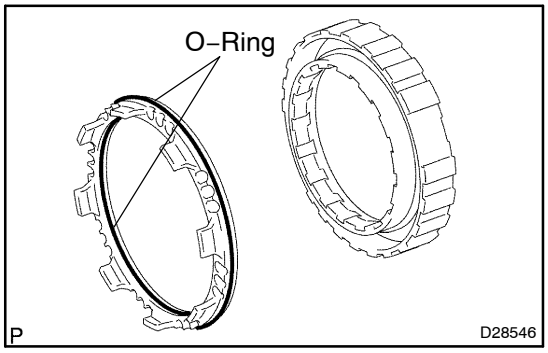
(b) Using feeler gauge, measure the B3 brake pack clearance between the snap ring and the flange.

Piston stroke: 0.42 – 0.72 mm (0.017 –0.028 in.)

If the piston stroke is outside the specification, parts may have been assembled incorrectly, so check and reassemble again.
If the piston stroke is still standard, select another flange.
HINT:
There are 4 different thickness for the flange.

Flange thickness: mm (in.)

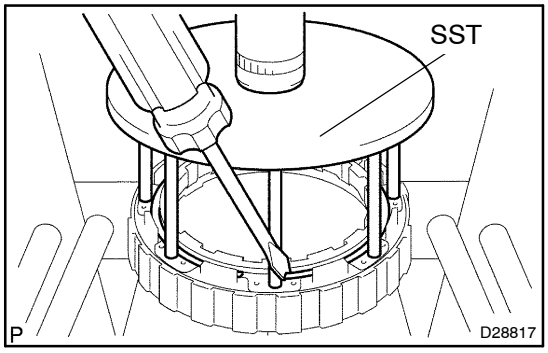
No.	Thickness	No.	Thickness
0	2.0 (0.079)	2	2.4 (0.094)
1	2.2 (0.087)	3	2.6 (0.102)



100. INSTALL 2ND BRAKE PISTON

(a) Coat 2 new O–rings with ATF, and install them to the 2nd brake piston.

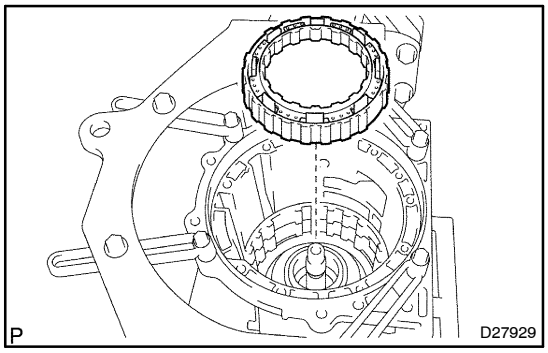
(b) Be careful not to damage the O–rings. Press the 2nd brake cylinder into the 2nd brake piston with both hands.



(c) Using SST and press, Install the snap ring.
SST 09351–40010

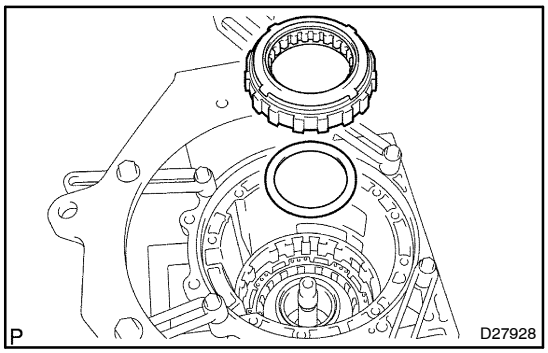
NOTICE:

Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



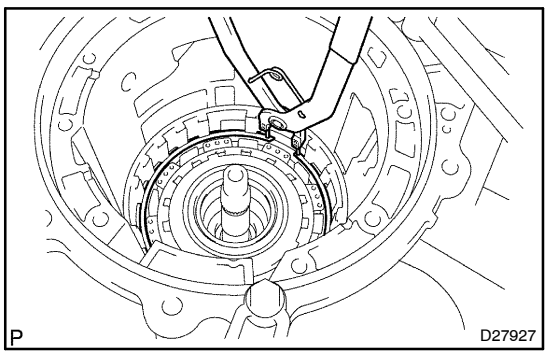
101. INSTALL 2ND BRAKE CYLINDER

(a) Install the 2nd brake cylinder from the case.



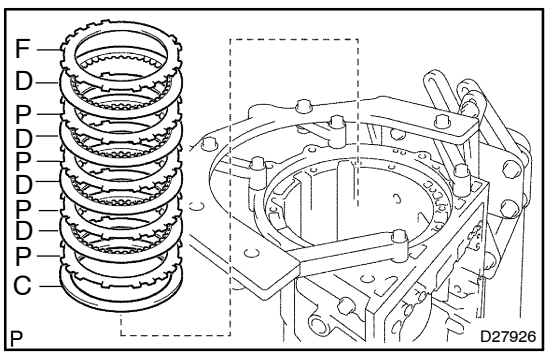
102. INSTALL 1 WAY CLUTCH ASSY

(a) Install the 1 way clutch assy and the thrust washer from the case.



103. INSTALL 2ND BRAKE PISTON HOLE SNAP RING

(a) Using SST, install the snap ring.
SST 09350–30020 (09350–07060)

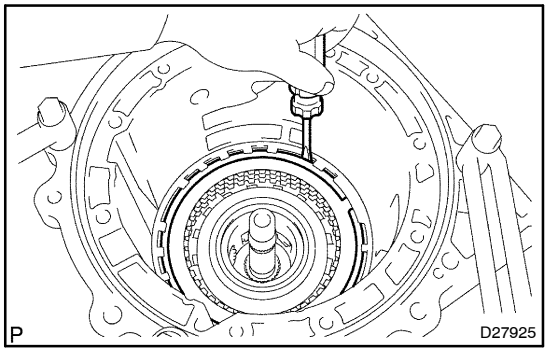


104. INSTALL BRAKE DISC NO.3

(a) Install the 2 flanges, the 4 discs and the 4 plates on the case.

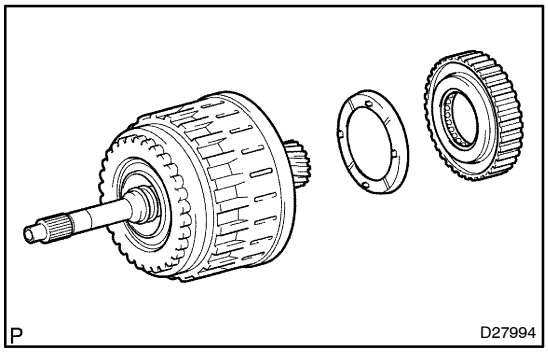
Install in order: P = Plate, D = Disc, F = Flange
C = Cushion

F – D – P – D – P – D – P – D – P – C



105. INSTALL BRAKE NO.3 SNAP RING

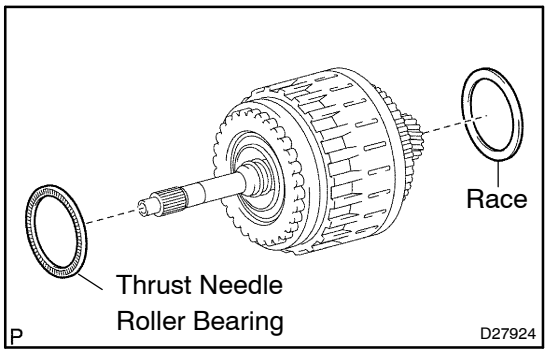
(a) Using a screwdriver, install the snap ring.
SST 09350–30020 (09350–07060)



106. INSTALL 1 WAY N0.2 CLUTCH ASSY

(a) Coat the race with petroleum jelly and install it onto the cluch drum thrust washer No.2.

(b) Install the 1 Way clutch assy No.2 washer No.2.



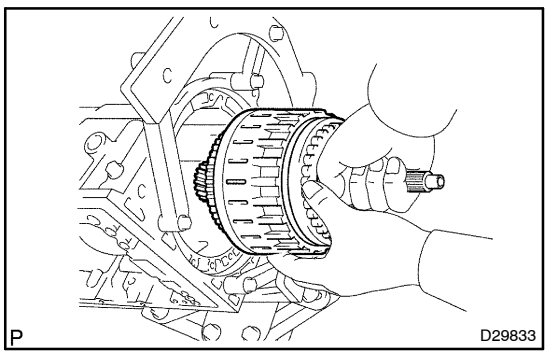
107. INSTALL CLUTCH DRUM & INPUT SHAFT ASSY

(a) Install the thrust needle roller bearing.

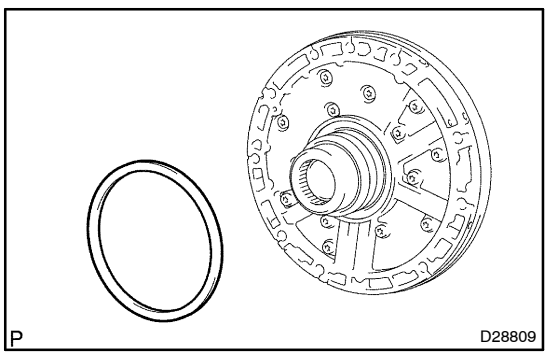
(b) Coat the race with petroleum jelly and install it onto the clutch drum & input shaft assy.

Thrust needle roller bearing and diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	71.9 (2.831)	85.6 (3.370)
Race	73.6 (2.898)	102.0 (4.016)



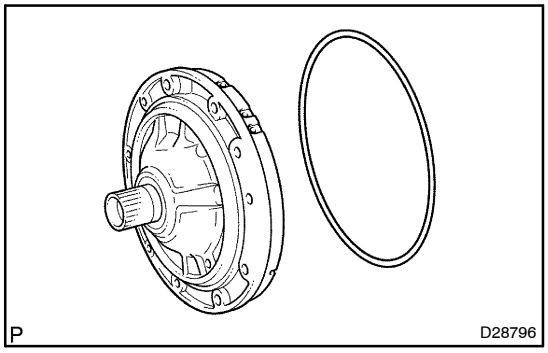
(c) Install the input shaft sub assy with the direct&reverse multiple disc assy onto the transmission case.



108. INSTALL OIL PUMP ASSY

(a) Install the thrust bearing race No.1 to the front oil pump

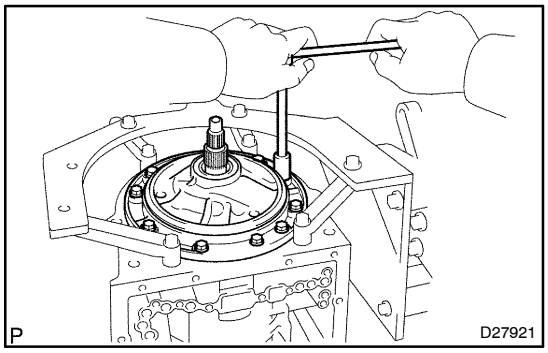
	Inside	Outside
Race	74.2 (2.921)	87.74 (3.454)

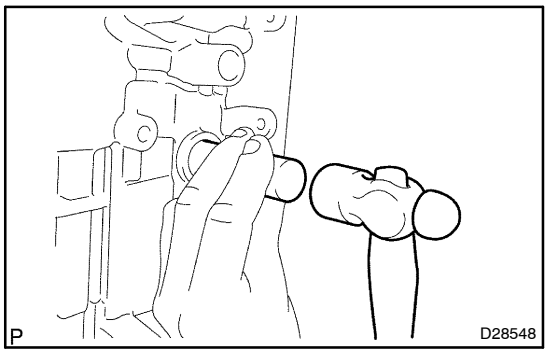


(b) Coat a new O–ring with ATF, and install it around the oil pump assy.
(c) Place the oil pump through the input shaft, and align the bolt holes of the oil pump assy with the transmission case.
(d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings into the overdrive direct clutch drum.

NOTICE:
Do not push on the oil pump strongly, or the oil seal ring will stick to the direct clutch drum.

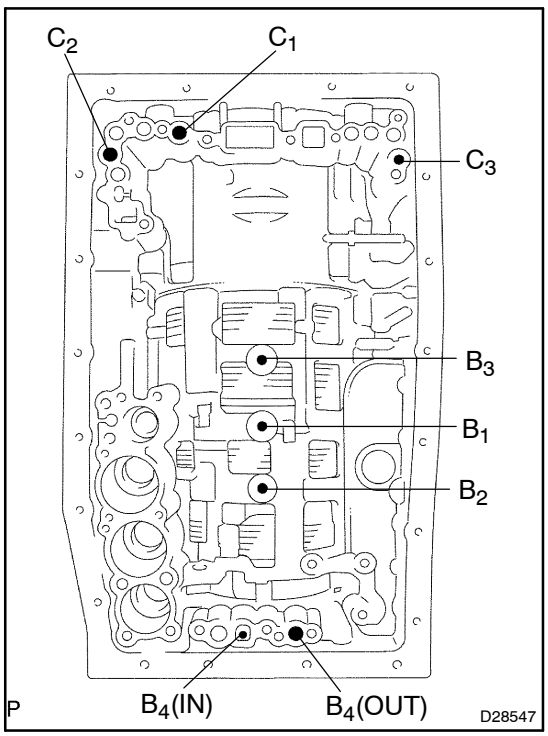
(e) Install the 10 bolts.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)





109. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using SST, drive in 2 new oil seals.
SST 09350–30020 (09350–07110)
(b) Coat the oil seal lips with MP grease.

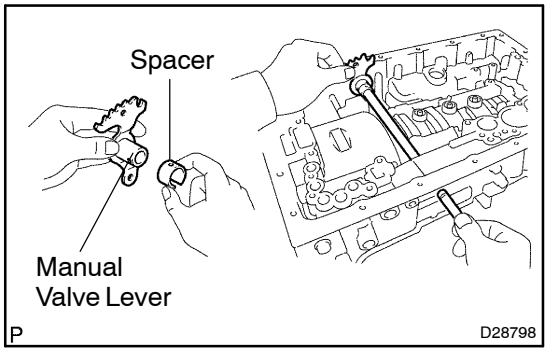


110. INSPECT INDIVIDUAL PISTON OPERATION INSPECTION

(a) Check the operating sound while applying compressed air into the oil holes indicated in the illustration.

HINT:
When inspecting the O/D direct clutch, check with the C_3 accumulator piston hole closed.
If there is no sound, disassemble and check the installation condition of the parts.

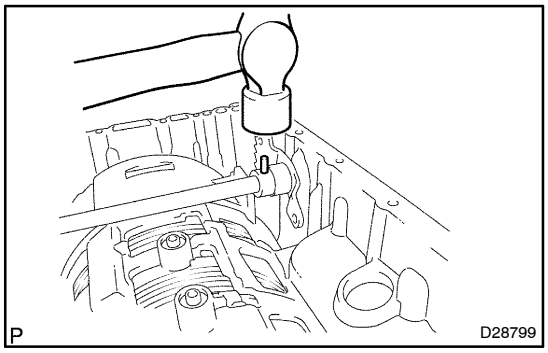
(1) Clutch No.2 (C_2)
(2) Clutch No.3 (C_3)
(3) Clutch No.1 (C_1)
(4) Brake No.3 (B_3)
(5) Brake No.1 (B_1)
(6) Brake No.2 (B_2)
(7) Brake No.4 (B_4)



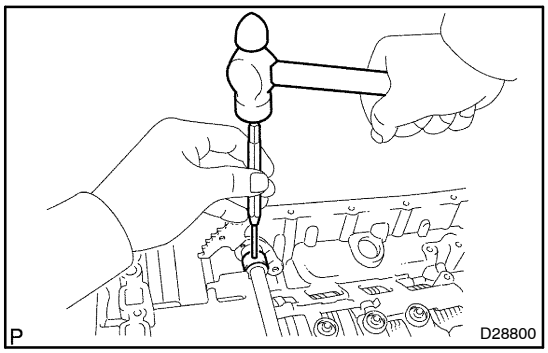
111. INSTALL MANUAL VALVE LEVER SUB–ASSY

(a) Install a new spacer to the manual valve lever.

(b) Install the manual valve lever shaft to the transmission case through the manual valve lever.

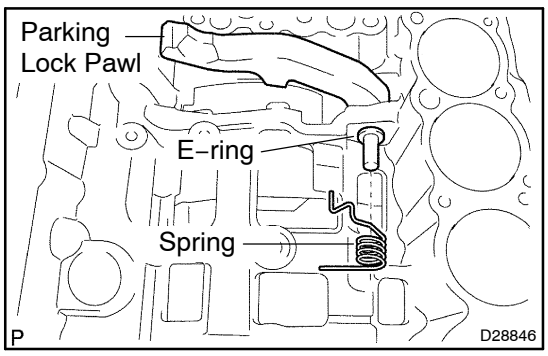


(c) Using a hammer, drive in a new spring pin.



(d) Align the manual valve lever indentation with the spacer hole, and stake them together with the punch.

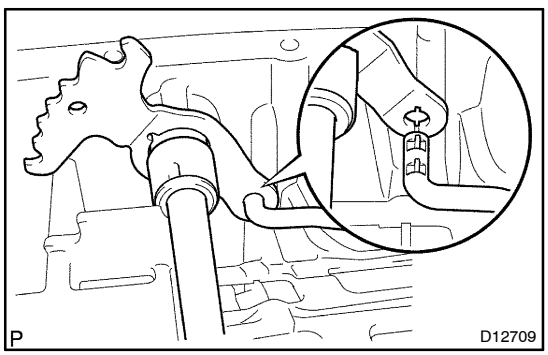
(e) Make sure the shaft rotates smoothly.



112. INSTALL PARKING LOCK PAWL SHAFT

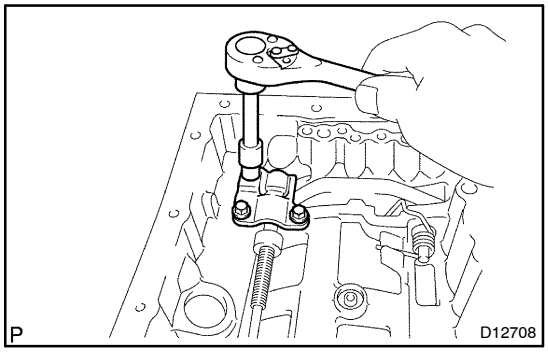
(a) Install the E–ring to the shaft.

(b) Install the parking lock pawl, the shaft and the spring.



113. INSTALL PARKING LOCK ROD SUB–ASSY

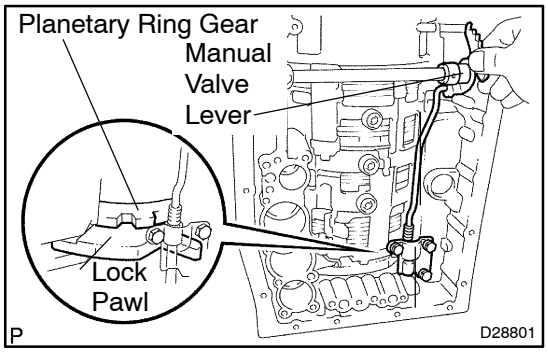
(a) Connect the parking lock rod to the manual valve lever.



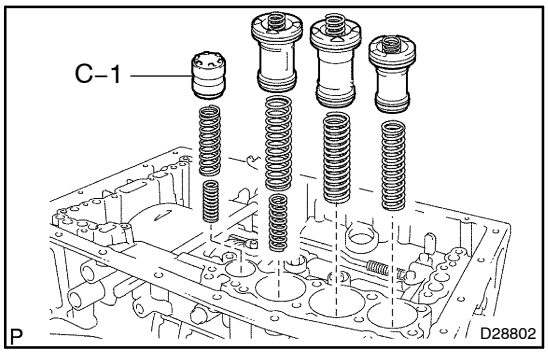
114. INSTALL PARKING LOCK PAWL BRACKET

(a) Place the parking lock pawl bracket onto the transmission case and torque the 3 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

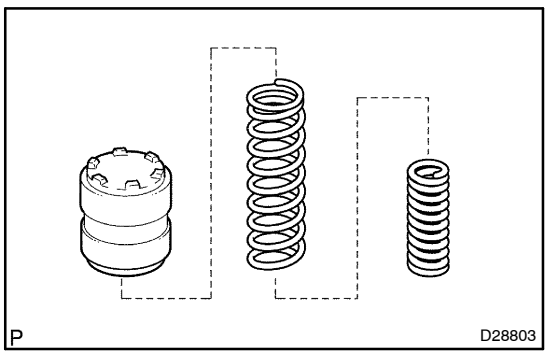


(b) Shift the manual valve lever to the P position, and confirm the planetary ring gear is correctly locked up by the lock pawl.



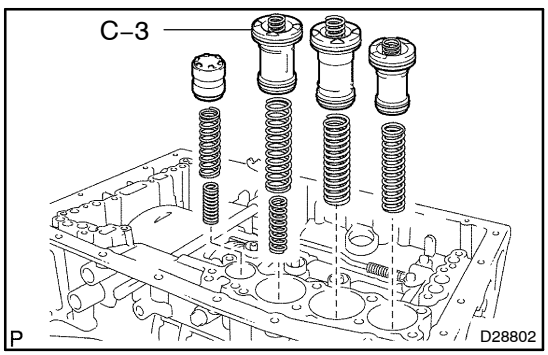
115. INSTALL C–1 ACCUMULATOR VALVE

(a) Install the spring and the accumulator valve to the hole.



Accumulator spring:

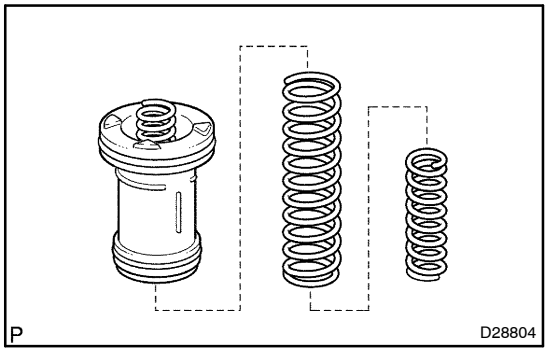
Spring		Free length Outer diameter mm (in.)	Color
C_1	Inner	30.40 (1.197) 11.40 (0.449)	Pink
	Outer	48.76 (1.920) 16.60 (0.654)	Light green



116. INSTALL C–3 ACCUMULATOR PISTON

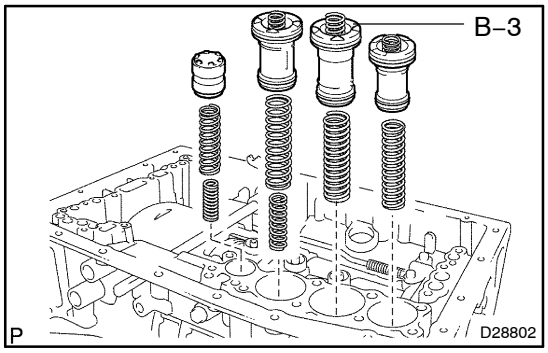
(a) Coat new O–ring with ATF, and install it to the piston.

(b) Install the spring and the accumulator piston to the hole.



Accumulator spring:

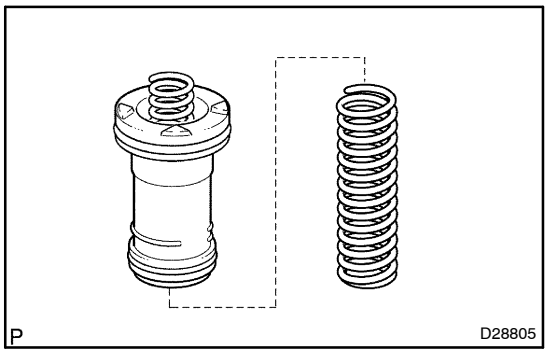
Spring		Free length Outer diameter mm (in.)	Color
C_3	Inner	44.0 (1.732) 14.0 (0.551)	Yellow
	Outer	73.35(2.888) 19.90 (0.784)	Red



117. INSTALL B–3 ACCUMULATOR PISTON

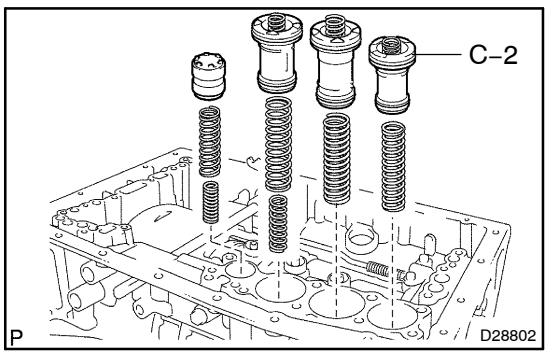
(a) Coat 2 new O–rings with ATF, and install them to the piston.

(b) Install the spring and the accumulator piston to the hole.



Accumulator spring:

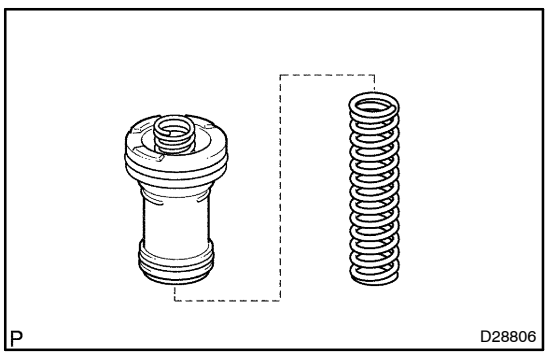
Spring	Free length Outer diameter mm (in.)	Color
B_3	70.5 (2.776) 19.7 (0.776)	Purple



118. INSTALL C–2 ACCUMULATOR PISTON

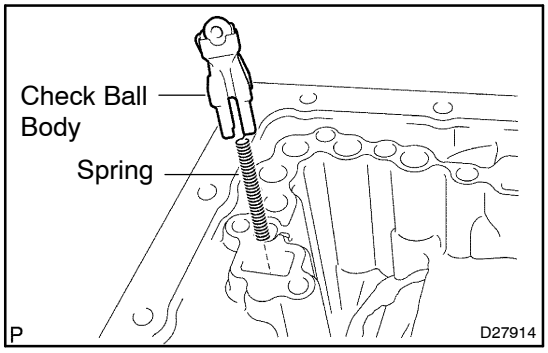
(a) Coat 2 new O–rings with ATF, and install them to the piston.

(b) Install the spring and the accumulator piston to the hole.



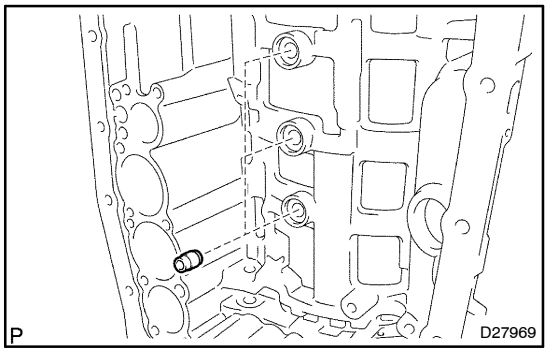
Accumulator spring:

Spring	Free length Outer diameter mm (in.)	Color
C_2	62.0 (2.441) 15.9 (0.626)	White



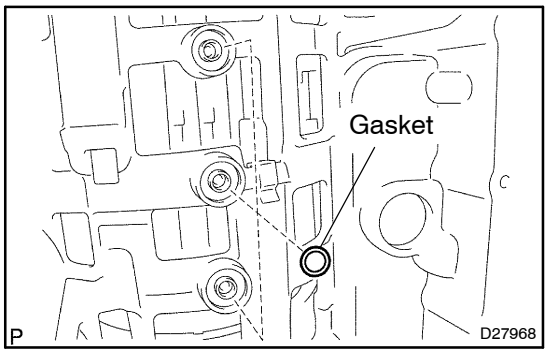
119. INSTALL CHECK BALL BODY

(a) Install the check ball body and the spring.



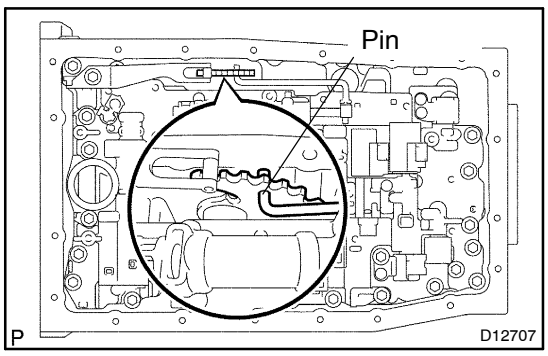
120. INSTALL BRAKE DRUM GASKET

(a) Install the 3 brake drum gaskets.



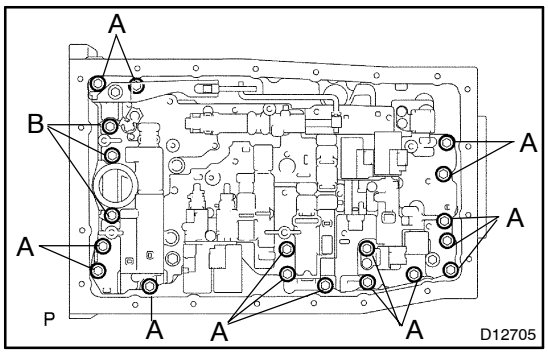
121. INSTALL TRANSAXLE CASE GASKET

(a) Install the 3 transaxle case gaskets.



122. INSTALL TRANSMISSION VALVE BODY ASSY

(a) Align the groove of the manual valve with the pin of the lever.



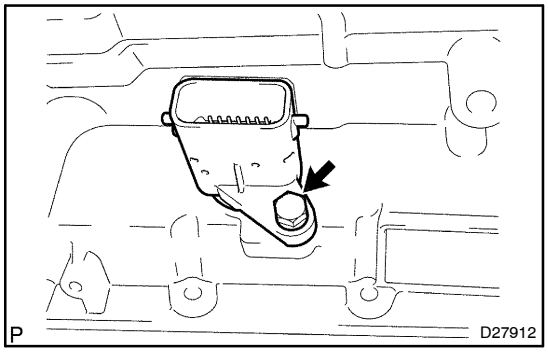
(b) Install the 19 bolts.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

HINT:

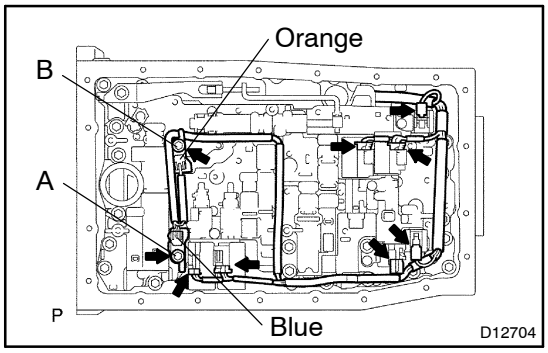
Each bolt length is indicated below.

Blot length:
Bolt A: 25 mm (0.98 in.)
Bolt B: 36 mm (1.42 in.)



123. INSTALL TRANSMISSION WIRE

(a) Install a new O–ring to the transmission wire.
(b) Install the transmission wire harness.
(c) Install the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(d) Connect the solenoid connector.

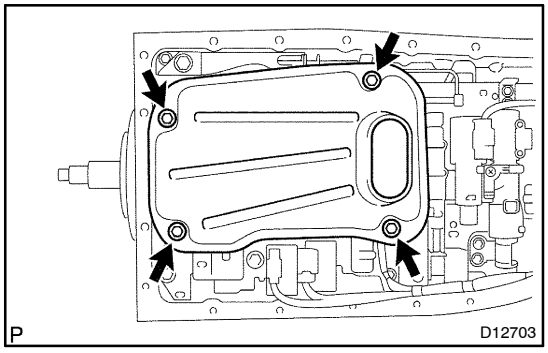


(e) Connect the 7 solenoid connectors.
(f) Install the ATF temperature sensor.
(g) Install the clamp and the 2 bolts.

A: 11 N·m (112 kgf·cm, 8 ft·lbf)
B: 10 N·m (100 kgf·cm, 7 ft·lbf)
Bolt length:
Bolt A: 36 mm (1.42 in.)
Bolt B: 12 mm (0.47 in.)

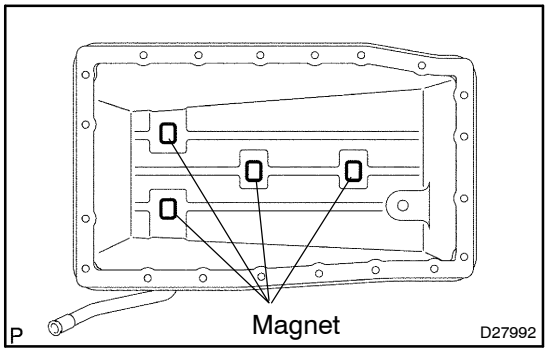
Sensor wire harness:

Wire harness	Color
for linear control	Orange
for oil temp warning lamp	Blue



124. INSTALL VALVE BODY OIL STRAINER ASSY

(a) Coat new O–ring with ATF, and install them to the valve body oil strainer assy.
(b) Install the oil strainer with the 4 bolts.
10 N·m (100 kgf·cm, 7 ft·lbf)



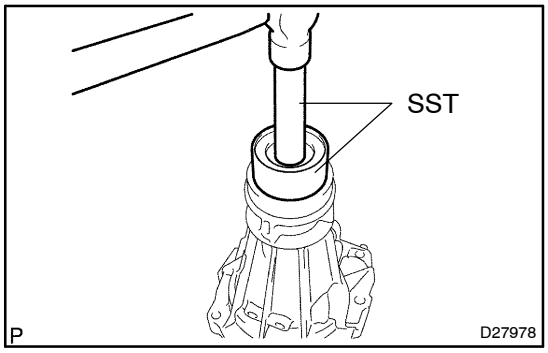
125. INSTALL TRANSMISSION OIL CLEANER MAGNET

(a) Install the 4 transmission oil cleaner magnets.

126. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB–ASSY

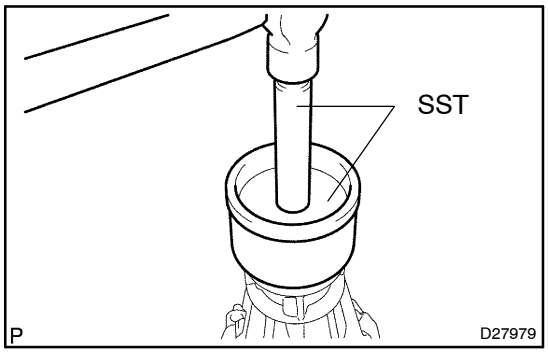
(a) Install a new gasket on the oil pan.
(b) Install and torque the 20 bolts.
Torque 4.4 N·m (45 kgf·cm, 39 in.·lbf)

(c) Install the drain plug.
Torque 28 N·m (285 kgf·cm, 21 ft·lbf)



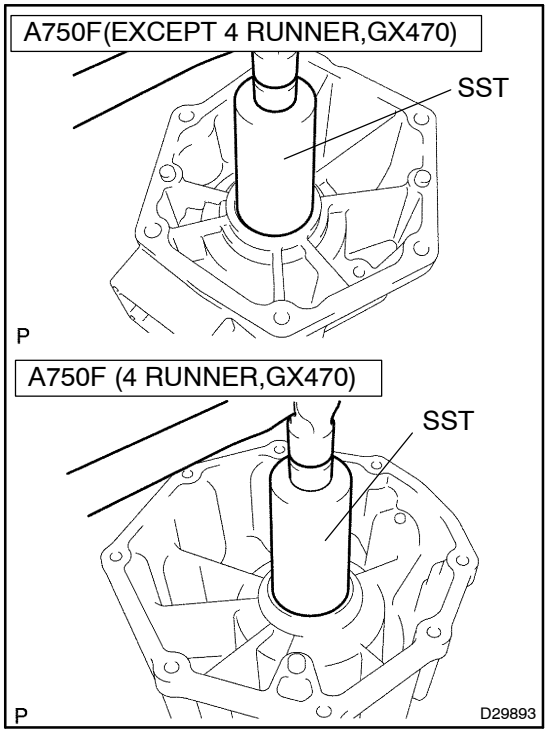
127. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL (A750E 4RUNNER)

(a) Using SST and a hammer, install a new oil seal.
SST 09710–30050, 09950–70010 (09951–07100)



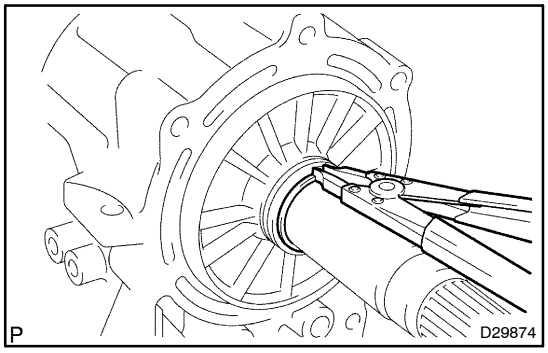
128. INSTALL EXTENSION HOUSING DUST DEFLECTOR (A750E 4RUNNER)

(a) Using SST and a hammer, install a new extension housing dust deflector.
SST 09223–15020, 09950–70010 (09951–07100)



129. INSTALL TRANSMISSION CASE ADAPTOR OIL SEAL (4WD DRIVE TYPE)

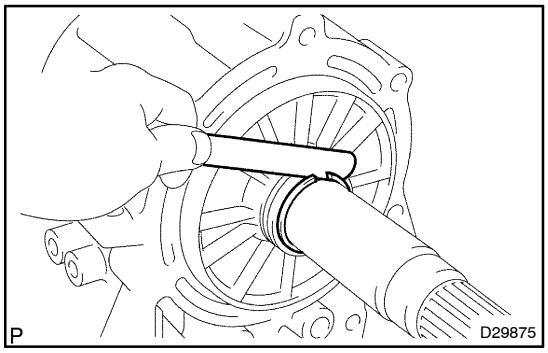
(a) Using SST and a hammer, install a new oil seal.
SST 09226–10010



130. INSTALL EXTENSION (ATM) HOUSING SUB–ASSY (A750E 4RUNNER)

(a) Install the thrust needle roller bearing and the 2 bearing races.

(b) Using a snap ring expander, install the snap ring.



(c) Using feeler gauge, measure the clearance between the snap ring and the race.

Clearance: 0.05 – 0.33 mm (0.002 –0.013 in.)

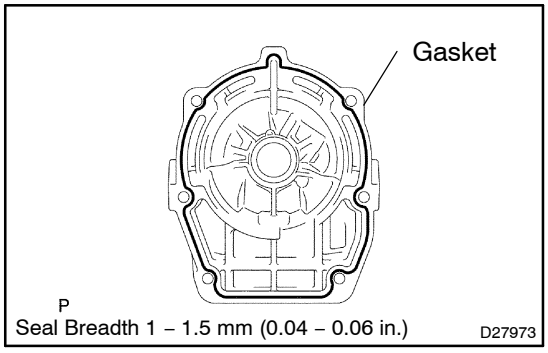
If the Clearance is still standard, select another race.

HINT:

There are 6 different thickness for the race.

Race thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.7 (0.146)	4	4.0 (0.158)
2	3.8 (0.150)	5	4.1 (0.161)
3	3.9 (0.154)	6	4.2 (0.165)



(d) Install the gasket from the extension housing.

HINT:

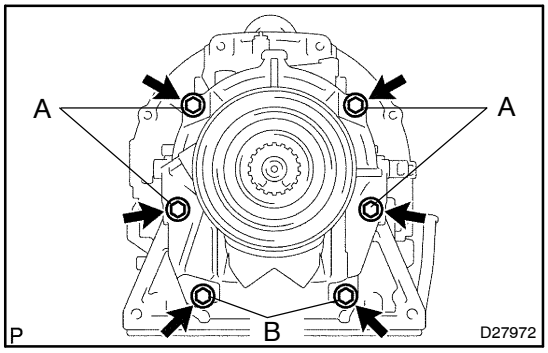
Take care not to drop the gasket.

(e) Clean the threads of the bolts and the case with white gasoline.

(f) Apply FIPG to the extension housing.

FIPG:

Part No.08826–00090, THREE BOND 1281 or equivalent



(g) Install the extension housing with new 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

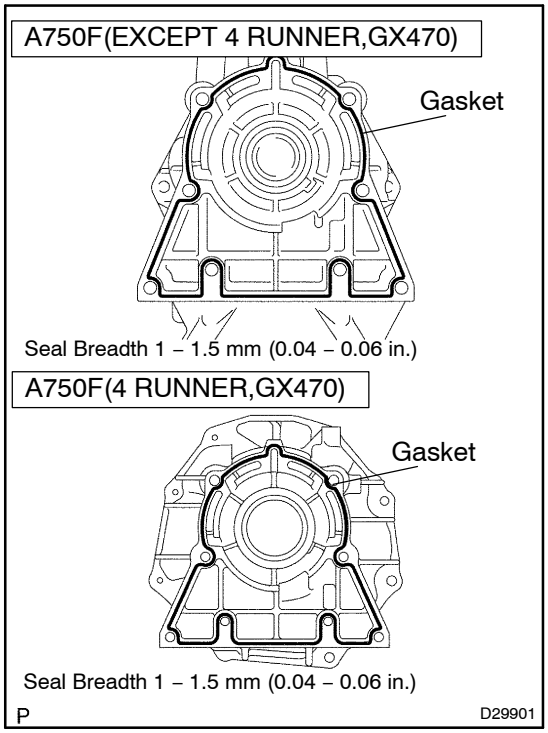
HINT:

Each blot length is indicated below.

Bolt length:

Bolt A: 45 mm (1.772 in.)

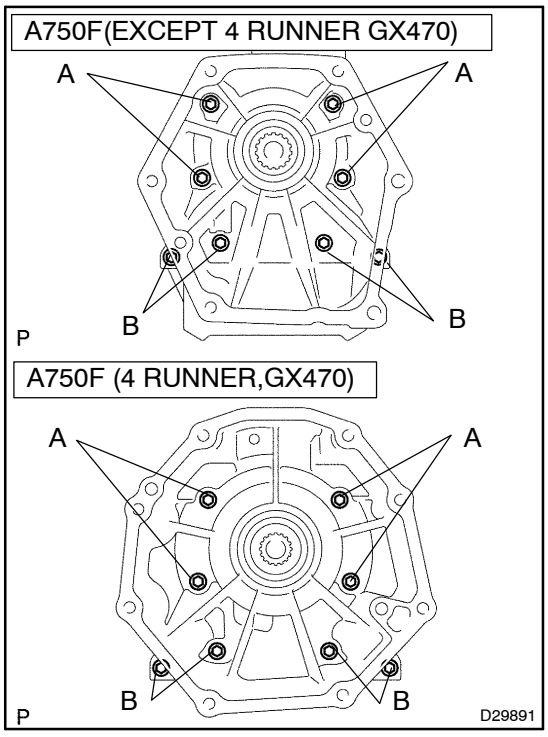
Bolt B: 35 mm (1.378 in.)



131. INSTALL TRANSMISSION CASE ADAPTER ADAPTER SUB–ASSY (4WD DRIVE TYPE)

(a) Apply seal packing or equivalent to the 8 bolts.

Seal packing:
Part No. 08826–00090, THREE BOND 1281 or equivalent.



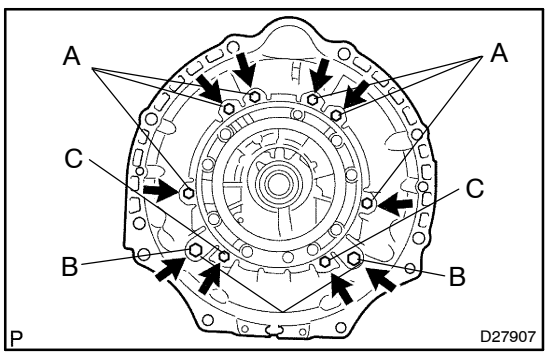
(b) Install the transmission case adapter adapter sub assy with the 8 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

HINT:

Each blot length is indicated below.

Bolt length:
Bolt A: 50 mm (1.969 in.)
Bolt B: 40 mm (1.575 in.)

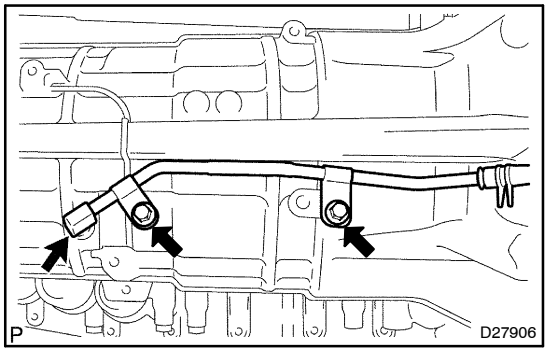


132. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean the threads of the bolts and the case with white gasoline.

(b) Install the transmission housing with the 10 bolts.

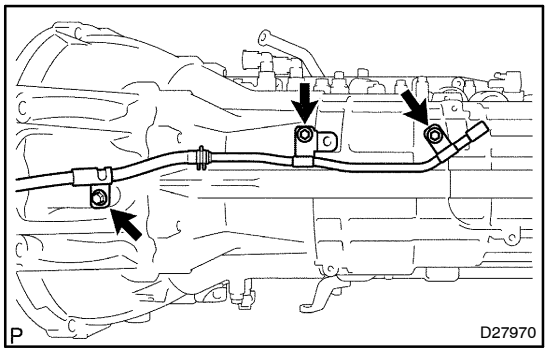
Torque:
A (14 mm bolt): 34 N·m (345 kgf·cm, 25 ft·lbf)
B (17 mm bolt): 57 N·m (581 kgf·cm, 42 ft·lbf)
C (14 mm bolt): 34 N·m (345 kgf·cm, 25 ft·lbf)



133. INSTALL AUTOMATIC TRANSAXLE BREATHER TUBE (A750F EXCEPT 4RUNNER,GX470)

(a) Install a new O–ring to the breather tube.

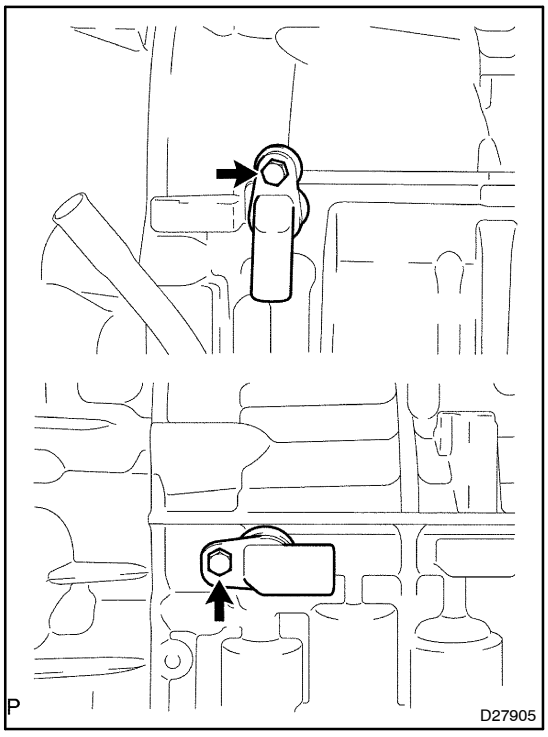
(b) Install the breather tube with the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



134. INSTALL AUTOMATIC TRANSAXLE BREATHER TUBE (A750# 4RUNNER,GX470)

(a) Install a new O–ring to the breather tube.

(b) Install the breather tube with the 3 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

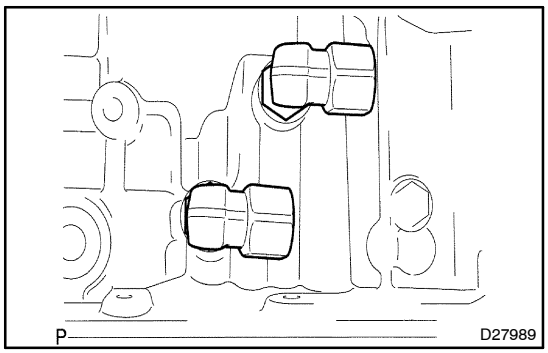


135. INSTALL TRANSMISSION REVOLUTION SENSOR

(a) Coat 2 new O–rings with ATF, and install it to the transmission revolution sensor.

(b) Install the 2 transmission revolution sensors.

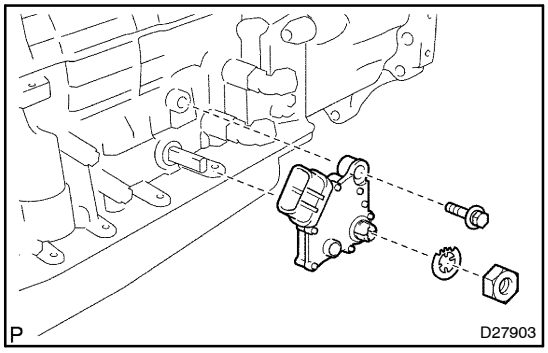
(c) Install the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



136. INSTALL OIL COOLER TUBE UNION

(a) Coat new O–ring with ATF, and install it to oil cooler tube union.

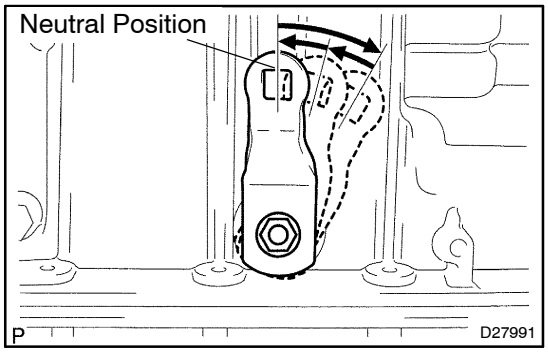
(b) Install the oil cooler tube union.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



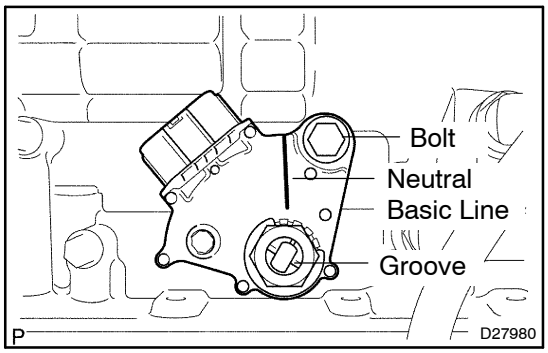
137. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

(a) Install the park/neutral position switch onto the manual valve lever shaft, and temporarily install the adjusting bolt.

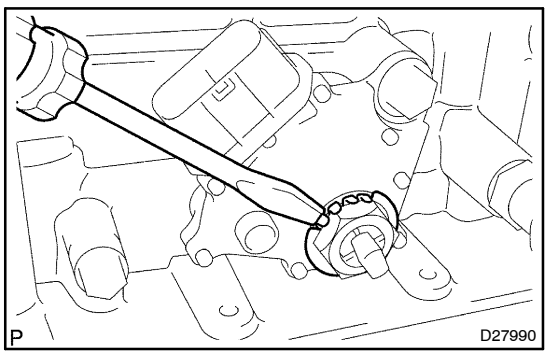
(b) Install the new lock washer. Install and torque the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)



(c) Using the control shaft lever, fully turn the manual lever shaft back and then return 2 notches. It is now in neutral.



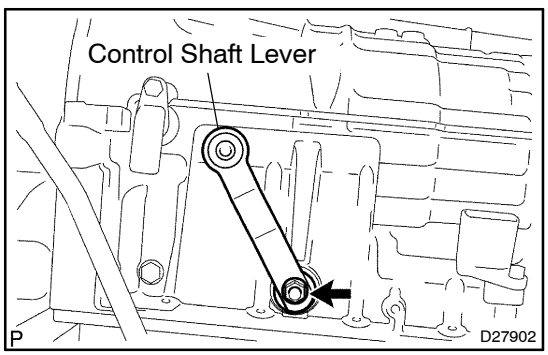
(d) Align the neutral basic line with the switch groove as shown in the illustration, and tighten the adjusting bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(e) Using a screwdriver, bend the tabs of the lock washer.

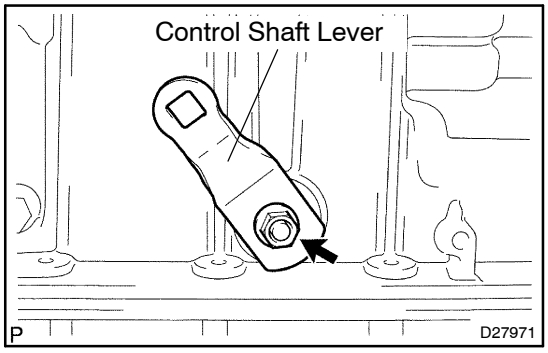
HINT:

Bend at least 2 of the lock washer tabs.



138. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH (A750F EXCEPT 4RUNNER,GX470)

(a) Install the washer and the nut to the control shaft lever RH.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)



139. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH (A750# 4RUNNER,GX470)

(a) Install the washer and the nut to the control shaft lever RH.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)